Pine Creek Watershed Report

...summarizing known facts, channel types, riparian conditions and watershed improvement opportunities.

Lassen National Forest
Eagle Lake Ranger District

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Purpose

The purpose of this report is to summarize known facts and conditions about the Pine Creek watershed, the primary tributary to Eagle Lake in Lassen County, California. The report includes the results of recent field work to inventory channel types, riparian zone conditions, and watershed improvement opportunities.

Watershed characteristics

Eagle Lake's drainage basin has a surface area of 404.3 square miles, and Eagle Lake itself has a surface area of 33.3 square miles[1]. **Pine Creek's watershed has a drainage area of 228.1 square miles or 52% of the total Eagle Lake basin area**[2].

The Pine Creek watershed contributes an estimated 75%-85% of the surface inflow to Eagle Lake in normal years. Considering that groundwater contributes an estimated 25% of the total inflow into Eagle Lake, **Pine Creek accounts for around 65% of all flows into the lake**[3]. After a dry winter, groundwater assumes a much greater portion of inflows to the lake; after a wet winter, surface runoff from snowmelt accounts for over 80% of inflows into the lake.

Pine Creek is perennial for only seven miles of its 35 mile main channel length. The perennial reach consists primarily of the spring-fed upper reaches of the creek, mostly above highway 44 near the Bogard work center. Other reaches of the creek are intermittent, flowing from the March thaw through early or mid June. Numerous tributaries, especially in the headwaters and in the northeastern portions of the watershed are ephemeral, flowing only during snowmelt periods or in response to infrequent rain-on-snow events.

Climate

Precipitation in the Pine Creek watershed occurs mainly in the form of snow, and amounts range from over 60 inches per year, at the western edge of the watershed, to 18 inches per year in the extreme northeastern portion of the watershed. **Map 1** in the envelope at the back of this report displays local precipitation estimates. Summer thundershowers can dampen the soil surface over limited areas, but they do not influence surface or groundwater flow. Pine Creek flows from the headwaters to Eagle Lake only when snow is still melting in upper Pine Creek Valley. When the flats near Bogard dry up, Pine Creek begins to rapidly lose most of its flow to bank seepage and valley floor groundwater storage. When snowmelt ceases to supply "new" water, tributary flows quickly subside, and Pine Creek's flows into Eagle Lake ebb and then cease in a few weeks.

Soils & geology

A few cinder cones exist in the upper portion of the watershed, and the valley floors are composed of shallow layers of alluvium underlain by layers of alternating fractured and "dense" rock (presumably lava flows and some alluvium).

Portions of the watershed above 6,000 feet elevation were glaciated in recent epochs. There are some limited outcroppings of rhyolite at the upstream end of McCoy Flat, north of Pine Creek. A clay layer is notable in Champs Flat and in McCoy Flat soils, and that hard pan layer limits rangeland site quality there. The "plus" side of clay pans is that they keep water on the surface in areas that would otherwise quickly drain into fractured basalts (and out of the surface and usable groundwater zones).

Soils in the Pine Creek watershed are almost entirely derived from recent and Pleistocene basalts. Except in the valley bottoms and rocky channel reaches along Pine Creek and low gradient reaches of some major tributaries, infiltration rates are high. Surface runoff is not normally a problem, even in active snowmelt periods, except on local bedrock areas, where roads have created impermeable surfaces, or where culverts concentrate flows. Very little (if any) sediment reaches Pine Creek from upland areas, even when local sheet erosion is occurring. Most sediment in the creek is mobilized in the streamside management zone by bank and channel erosion and washed downstream by the creek. Some rock and gravel material moves into the upper end of the large flats as bedload. Sand and silt sized sediment pile up as channel bars in the flats, and some finer material reaches Eagle Lake as suspended sediment during high flows. Very little coarse material moves into the lake, even during high flow periods. No obvious delta of sand or gravel exists at the mouth of Pine Creek, but muddy plumes of silt and clay sized material extend into Eagle Lake during high flows. The bay that receives Pine Creek's flows has a deep, muddy lakebed, composed mainly of fines washed from the Pine Creek watershed.

Topography and land forms

Pine Creek includes several tributary subbasins. They are listed in Table 1, below.

Pine Creek's main channel drops from an elevation of 7,066 feet at Triangle Lake in the Caribou Wilderness to Eagle Lake (current elev. 5,101 feet[4]). Most of the watershed above 6,200 feet elevation was glaciated in Pleistocene times, and the parent material's lava flow escarpments are somewhat rounded. Numerous pothole lakes seem to be part of the Pine Creek watershed, based on contour line elevations, but they are really the bottom of isolated "mini watersheds" that seldom or never yield surface flows to more distant, downhill areas in the watershed. Triangle Lake is not the extreme western (upstream) end of the watershed, but it is a reasonable starting point for describing the main channel. Figure 1 is a Pine Creek profile, showing an exaggerated cross sectional view of Pine Creek's main channel[5]. The figure clearly shows the channel dropping through several small flats, then crossing a sequence of four much larger downstream valleys separated by rocky chutes, before the creek drains into Eagle Lake.

The major valley outlets are controlled by blocking basalt dikes that have effectively prevented additional downcutting in the flat valleys above them. The valley outlets have acted like natural check dams and limited valley channel erosion that would have otherwise occurred. The limited entrenchment of Pine Creek in Champs Flat and McCoy Flat are due more to such geologic "aids" than to any positive results from our land management practices.

Appendix 6 includes a series of maps that show the Rosgen channel type for all reaches of Pine Creek and for its main tributaries.

Table 1--Main Pine Creek Subbasins

SUBBASIN NAME	AREA (SQUARE MILES)
Martin Creek	20.6
Harvey Valley area:	
Harvey Valley (main)	26.8
Burgess draw	5.8
Shoestring draw	5.4
Little Harvey Valley	6.8
Squaw Valley	6.7
Antelope Creek	13.0
Prison springs/ Penitentiary flat	3.0
Gordon Creek[1]	15.6
Pine Creek (total)	224.5

1. NOTE: The Gordon Creek watershed is particularly complex. The area that actively contributes to streamflow is around 7.6 square miles (only 49 % of the mapped subbasin area), because most of the subbasin is a relatively low precipitation zone, and it includes several, isolated "no runoff" basins.

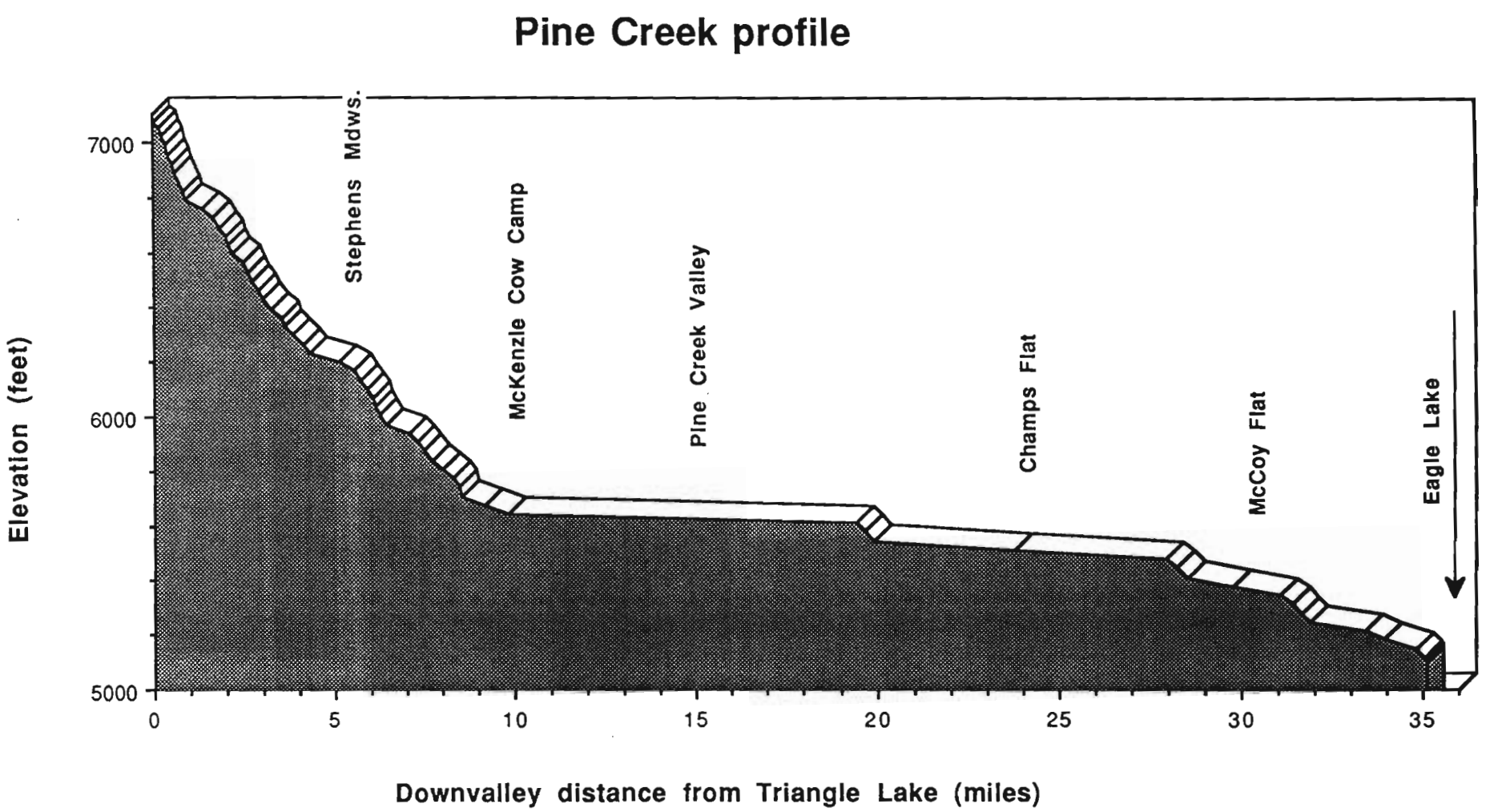

Pine Creek profile
Elevation (feet)
7000
6000
5000
0
5
10
15
20
25
30
35
Stephens Mdws.
McKenzie Cow Camp
Pine Creek Valley
Champs Flat
McCoy Flat
Eagle Lake
Downvalley distance from Triangle Lake (miles)

Figure 1

Wetlands

The Forest Service has constructed or is planning five wetland developments for waterfowl nesting in the Pine Creek watershed. The largest development is the Pine Creek wetlands, where Martin Creek joins Pine Creek. It covers around 120-160 acres, including nearly a dozen nesting islands. That development holds water through most summers on around 20 acres of marshy area near the dam and in moats around the islands. The wetland provides most of the late summer forage on the Lower Pine Creek allotment. Other wetlands are much smaller. They include the (unnamed) satellite wetland just north of Pine Creek wetland, Burgess Valley, Antelope Creek, and the lower end of Little Harvey Valley. They also provide valuable late season grazing sites, when the wetlands support the only green grass to be found in the allotments in August.

The wetlands serve a number of beneficial purposes, including waterfowl propagation, water storage in the intermittent stream areas, nutrient and sediment trapping, and wildlife and livestock watering. The Forest Service and the Department of Fish and Game have agreed to defer consideration of any wetlands or reservoirs on the main channel of Pine Creek. DF&G is concerned that impoundments could obstruct possible upstream migration of Eagle Lake trout, that they could affect the temperature or duration of outlet flows at Pine Creek's outlet, and that any larger reservoirs could become a reservoir for undesirable fish species that might subsequently move downstream and become established in Eagle Lake.

Past and present land uses

The Pine Creek watershed has been impacted by three major types of human activity since the 1880's: (1) Livestock grazing, including some range "improvement" work; (2) Logging; (3) Railroad grade construction for initial entry of major timber sales and road building, often using old railroad grades.

Livestock grazing

Livestock grazing has mainly impacted the valley floors along the main channel and tributary streams. Large numbers of sheep and cattle were historically grazed along Pine Creek and in the Eagle Lake basin.

In the mid-1870's Eagle Lake basin was primarily used as sheep summer range, and one rancher grazed a herd of 2,700 Angora goats between Roop Mountain and Eagle Lake[6]. Albert Gallatin eventually acquired a majority of ranch holdings in the basin, and by 1914 his manager grazed a herd varying from 12,000 to 20,000 sheep in the basin. Present grazing permits authorize only 405 cattle in Eagle Lake Basin (including McCoy Flat) approximately 930 in Pine Creek Valley[7].

In Harvey Valley, the earliest record of grazing was in 1870, when the Cone Ranch and the Ward Sheep Company used Harvey Valley as a summer headquarters for sheep grazing operations. Cone Ranch brought in 25,000 to 30,000 sheep; Ward Sheep Co. brought in 15,000 to 30,000 head. 6,000 sheep were kept in Harvey Valley for the full season, and 50,000 head trailed across the allotment each spring and fall. When the National Forest was formed in 1906, numbers were reduced to 3,500 head for six months. In 1918, 4,542 sheep and 847 cattle and horses were permitted on government land[8]. Present use is 500 cow-calf pairs, for 2,500 animal months.

In Champs Flat, grazing started in 1860. The heaviest reported use was in 1925, with 9,000 sheep and 170 cattle permitted. In 1945, permitted use was 2,000 sheep and 188 cattle. Sheep were no longer permitted in 1961, and the permits authorized grazing by 520 cattle. In 1922, 4,500 animal months were authorized; in 1967, 2,100 animal months were authorized. Present grazing use is 550 cattle.

The Upper and Lower Pine Creek allotment areas were once part of the McKillop, Pine Creek, and Campbell sheep ranges. In Pine Creek valley, numbers were reduced to 472 cattle in 1928; previous use had been for 1,440 sheep and 1,094 cattle and horses. Present use is for approximately 930 cattle (both allotments).

Deer and antelope also graze widely in the Pine Creek watershed. Cattle routinely concentrate in riparian zones along Pine Creek and around small lakes, reservoirs, and stockponds. Springs were important as water sources and grazing sites, because they offered the most dependable year round water in many places before windmills and stock ponds were installed, and they are still important water sources. Upland grazing impacts are less notable, except near water sources such as springs. Aspen trees in many upland sites are not regenerating because cattle browse their sprouts.

their sprouts.

In the last decade, the Eagle Lake Ranger District replaced over a dozen windmills with stock ponds. Many stockponds built in recent years were excavated in stream channels, including Pine Creek.

Possibly during the railroad building for logging in 1938, the outlet of Little Harvey valley was "lowered" by using a dragline and bucket to excavate a six to eight foot deep ditch from the outlet ridge to Pine Creek's main channel. It is uncertain now whether the ditch was dug to facilitate logging and railroad construction around Little Harvey Valley, or whether it was supposed to "improve" range conditions by draining the valley and promoting the replacement of sedges by grass. In any case, the middle and lower end of Little Harvey Valley now support extensive areas of grass and sagebrush where the area was once a sedgy marsh most of the summer. Recent Forest Service improvement work has included constructing a low dam to enhance wetland values in the lower end of the valley, and restoring the outlet's original elevation by creating a low dam at a bridge site near the valley outlet.

Livestock grazing has been managed under season long use in most of the allotments, with the notable exception of Harvey Valley. The Harvey Valley allotment has been managed under various forms of rest rotation system grazing since 1951. It was originally managed under a five pasture system, but it is now in a three pasture setup[1]. Starting in 1987, the other allotments below Highway 44 are being converted to deferred-use grazing schemes, using at least two pastures.

Timber harvesting

Timber has been harvested in the upland areas in Pine Creek watershed since the Lassen National Forest was established in 1905. Most of the big timber sales in the Pine Creek Valley and Harvey Valley areas were first logged in the late 1930's and into the early 1940's, primarily by railroad logging. Timber sales have continued to the present, with most log yarding now being done by ground skidding. Harvest prescriptions have recently shifted from sanitation-salvage marking to regeneration cutting. A few harvest units have been clearcut in recent years, and more clearcutting is planned for the Pine Creek watershed.

Railroad grades and roads

The first large scale logging operations in most of the Pine Creek watershed were done by railroad logging--mainly downstream from Highway 44. The Red River Lumber Company was one of the biggest local logging companies, and they had several long term logging contracts on the Lassen National Forest. Railroad lines were built in the Harvey Valley area in the 1930-1936 period[9]. The railroad line at the outlet of Little Harvey Valley was built in 1938, and the lines extended into the Champs Flat area in 1940/1941 and were extended into McCoy Flat in 1942. Typically, main lines followed steady, low gradient paths between timbered hills in the Pine Creek area. Railroad lines were "turnpiked" across valley bottoms, using draglines and buckets to scoop dirt from one or both sides of the line to build the raised railroad grades. Streams were crossed by using log trestles and box or metal-drum culverts. Dirt and rocks along the railroad lines were moved by drag lines to provide fill materials for the grades, and ties were sawn from local timber (often white fir). Large pine logs were cabled downhill to railroad spurs and transported via main lines to the mill at Westwood.

All the old railroad grades in the watershed are now abandoned, except for the Western Pacific line that crosses the upper end of Pine Creek Valley, just east of Highway 44. In the mid-1970's, Western Pacific replaced several trestle sections in the turnpike across Pine Creek valley with a single, narrow trestle, and with two secondary culverts to the south to pass occasional high water from extreme floods. The existing railroad grade has confined flood flows that formerly moved Pine Creek's main channel back and forth across the floodplain in the upper end of Pine Creek Valley, and the stream's sinuosity is gradually being reduced as peak flows are continually directed to the north side of the valley. The creek and its floodplain could gradually drop below the general valley floor, with corresponding drops in water table levels and loss of near-surface groundwater storage.

At present, banks just downstream from this railroad crossing are stable, and the channel seems to be protected by occasional basalt cobbles. The next (abandoned) railroad crossing over Pine Creek is located approximately 3 miles downstream from the active Western Pacific line. It is labeled as Site 15 on **Map 1** and in **Appendix 3**, the watershed improvement list. Here, the grade includes a wide gap where a

1. The main departure from strict rest rotation has been informally-authorized, late season use of the rest pasture in recent dry years.

trestle was removed. Again, Pine Creek is "pinned" to this opening during high flows, and natural meandering and channel relocation is somewhat reduced in this part of Pine Creek valley.

The railroad grades below Logan Springs are also listed in **Appendix 3** (Site 8), but they present a somewhat different problem. Here, the valley narrows toward a rocky, stable outlet reach, which is well armored by basalt boulders, and the old railroad grades force the creek into a confined channel, focusing its erosive power on the streambed and on downstream banks. Some deep scour pools have formed in the channel just downstream from the eroding embankments of the two railroad grades, but banks are generally well stabilized by grass, so the pools do not seem to be growing. Further downstream, in the canyon between Champs Flat and McCoy flat, the railroad grade is too close to Pine Creek[2]. High water runs down two sections of the old railroad grade. All the roadbed fines have been washed downstream, and only boulders and cobbles remain. These old railroad throughcuts are now "railroad bypass channels," and they are still eroding along their sides or "banks."

Hydrology

Land uses have changed the duration of flows and the length of the perennial reach of Pine Creek, from the 1860's to the present. Water tables have been lowered, and surface and groundwater storage in the watershed's major valleys has been reduced by such activities as road construction, ditching, and livestock grazing.

Any assessment of the recovery potential of the two "worst" areas, Champs Flat and McCoy flat, is hindered by our lack of knowledge concerning what their "natural" conditions were like before livestock grazing began. Livestock grazing and drainage impacts of railroad grades and roads have changed water retention patterns, altered vegetative cover and composition, and flattened stream channel profiles. Some local ranchers claim that Harvey and Little Harvey Valleys were marshes for most of the summer as recently as the 1930's, before the railroads were built.

Hydrologic impacts from livestock

The adverse effects of season long grazing are obvious in many areas along Pine Creek. The main impacts of livestock grazing on Pine Creek are described in **Table 2.** These effects are most notable downstream from Highway 44 to McCoy Flat. They are especially severe in Champs Flat and McCoy Flat. For example, in upper Pine Creek valley, the channel is well covered with sedges and bordered by grass on the outside fringe of the riparian zone. However, the vegetation is close-cropped by cattle at the end of the grazing season. While there are few eroding banks in this reach, the channel is wide and shallow, with poor entrenchment of intermittent flows (Rosgen type C5). Here, riparian vegetation is dense and provides good soil cover, because of higher precipitation and a longer flow period in the creek. Erosion is not a problem, but channel shape has been affected by its history of season long grazing. The desired channel condition here would be for the active channel to be narrower and deeper, with sedge masses hanging over the banks (Rosgen type C6). Water temperatures and overhead fish cover would be much improved, and the channel would meander more in its flood plain.

Hydrologic impact of timber harvesting

While road building to access timber sales has somewhat changed upland drainage patterns and increased the extent of compacted land in the watershed, surface runoff does not usually reach Pine Creek or its major tributaries. The upland soils have rapid infiltration rates, and the broad valleys offer wide, buffering infiltration plains where runoff disperses and slows and where sediment settles. Snow on upland areas does not directly affect Pine Creek after the flats melt out, but upland snowmelt does contribute to local groundwater and soil moisture, and it supplies source water to springs around the valley margins. Tree removals have probably not increased water yields, since most sites have been reoccupied by brush or young trees. To the extent that upland areas are somewhat less shaded than they were at the start of the century, snowmelt rates have probably increased slightly. The main effect of 50-75 years of timber harvesting is the construction of railroad grades and roads that have been built to get the timber out. Harvesting may have slightly increased spring flow peaks while shortening the meltout period, but this hypothesis is unproven.

2. Refer to **Map 1**, sites 10 and 11.

Table 2--Effects of livestock grazing on Pine Creek

- Depletion of vegetative cover, loss of organic matter, and erosion of valley floor soils;
- Loss of riparian hardwoods (aspen and cottonwoods) in areas accessed by livestock, due to browsing of seedlings and suckers;
- Reduction or removal of willows and aspen where they would normally occur;
- Degradation of stream channels from a meandering, narrow channel with overhanging banks[1] to wider channels with sloped-back banks, without hardwoods or good cover by riparian vegetation, and sometimes with extensive bank or streambed erosion[2] in Pine Creek Valley, Champs Flat, and in McCoy Flat;
- Accelerated channel erosion in most vulnerable reaches, mainly on the flats where the streambed has no cobble or boulder armoring;
- Lowering of water tables by two to six feet at many valley locations along the middle reaches of Pine Creek; and
- Shortening of the active flow period in intermittent reaches of Pine Creek by some time between a week or two and a month[3] (and presumably of the period when Pine Creek flows through to Eagle Lake by a period of several weeks).

1. Rosgen type C6
2. Rosgen channel types C4 and C5
3. This conclusion is based on field observations and professional judgment. Extensive water balance calculations would be necessary to better estimate the hydrologic effects of lowered water tables and the consequent reduction in underground water storage capacity and sustaining seepage to streams.

Hydrologic impacts of railroads & roads

The loggers dug ditches beside their rail lines to drain the roadbed and to get fill for the grade. When the rail lines either crossed or paralleled Pine Creek or its tributaries in the watershed's major valleys, their hydrologic effect was to lead runoff downstream, to drain the valleys, and to lower local water tables. After the 1940's, logging roads replaced railroad grades in the watershed, and while some grades were used by trucks, many railroad grades were abandoned. Many miles of new logging roads were built, especially in upland areas away from the valley floors. The roads created additional areas of low permeability, and some local runoff is produced from them, but coarse upland soils still quickly absorb road-generated runoff outside the valley areas. Sediment moves into streams when roads drain water directly into Pine Creek or its tributaries; when culverts are undersized for flood flows; or when culverts are blocked by debris and roadbeds wash out.

The road with the greatest direct, negative impact on Pine Creek is Forest Service road 32N22, which crosses Pine Creek about two miles above Highway 44. Road drainage from nearly 1/4 mile of road spills directly into Pine Creek at the crossing.

The main hydrologic effect of roads is to speed the drainage of upland and valley areas, because their ditches often feed snowmelt directly to the watershed's stream network.

Streamflows and gauging data

Stream gauging information is available from two stations on Pine Creek. Flow data from the stations is shown on four graphs included as **Appendix 6** to this report. The graphs show the differing seasonal

flow patterns at the two stations and the size of their peak flows at various design "return" intervals. **"Pine Creek near Susanville Calif.[10]"** is a station located at the fish trap weir near the outlet of Pine Creek by Eagle Lake. **Figure 6-1** shows a flow duration curve for Pine Creek as it approaches Eagle Lake, based on the data from that station. The figure shows that lower Pine Creek flows for an average of only 30% of the time, and it flows above 10 cfs for only 22% of the year. **Figure 6-2** shows peak flows for this station. The peak flow expected to occur once every five years is around 700-800 cfs. The flow expected once in a century would be around 1,500 cfs.

"Pine Creek near Westwood Calif.[11]" is located approximately 100 yards upstream from Bogard Campground, 1.5 miles upstream from Highway 44, in Pine Creek's perennial reach. Its flow duration curve is shown as **Figure 6-3**, and it shows the station's much smaller, perennial, flows that represent drainage of the wettest 10% of the Pine Creek watershed. **Figure 6-4** shows peak flows for this station. The peak flow expected once in five years is only around 150 cfs at this station, and the "100 year flow" is around 300 cfs. Thus, *the perennial reach of Pine Creek has peak flows only 20% as great as the recorded peak flows at the outlet.* The intermittent and ephemeral reaches (especially the Pine Creek Valley and Harvey Valley areas with their nearby hills) account for more than 80% of the flow peaks coming from the Pine Creek watershed.

Most of the water sustaining the perennial reaches and prolonging intermittent downstream flows comes from less than 40% of the watershed--mainly the upper Pine Creek Valley (Bogard Flats) area and upper elevation areas where snow lays deeper and melts longer. The middle reaches of Pine Creek (including the Harvey Valley drainages) and the lower reaches melt out quickly in the spring, and they provide the initial channel saturation needed before the "active" springtime flows can reach Eagle Lake. The middle reaches of Pine Creek are also major contributors to annual peak flows, and occasional rain-on-snow events in these areas cause "flashy" peak flows to Eagle Lake. **Figure 6-2** shows this effect, with relatively large flows occurring at infrequent intervals. Flows exceeding 800-1,000 cubic feet per second at the lower gauge are a watershed response to rapid warming of the snowpack, either by rain or by abnormally-hot, early spring weather. Pine Creek in recent years has never flowed more than 3 1/2 months, and it flows more than 100 cfs for only two or three weeks per year, i.e. around 5 % of the time.

If the immediate and long term hydrologic goals were attained, flows would be prolonged, and channel conditions for fish and wildlife resources would be improved. The fish trap's efficiency and the potential for eventual upstream movement by Eagle Lake trout would be improved by a lengthened flow period. Extending the flow period would also improve riparian zone conditions along the main channel, by extending the effective "irrigation" period for riparian and aquatic plants. Improved management should lengthen the perennial reach of Pine Creek into Pine Creek Valley--or at least raise water table levels there.

Fisheries

Pine Creek is vital for Eagle Lake trout spawning. Trout were once able to swim upstream to perennial reaches of Pine Creek to spawn, and their young then moved back downstream to Eagle Lake the following spring. Presently, spring flows attract and provide a pathway for Eagle Lake trout to reach the California Department of Fish and Game trap just upstream from the lake. The DF&G is interested in prolonging the duration of flows in the lower reaches of Pine Creek, both to extend the period that trout can swim to the trap, but to eventually restore some natural spawning. The upstream, perennial, seven mile section of Pine Creek supports a native brook trout population, although few trophy size trout are produced there. The DF&G occasionally transports Tahoe suckers from the fish trap, upstream above the County Road A1 bridge, so they can spawn and maintain their numbers as a minority species in Eagle Lake.

Riparian zones

Pine Creek supports several distinctive riparian plant communities along its main channel, in some major tributaries, and around springs. The general riparian types are described roughly in **Appendix 1.** Riparian zone condition codes are detailed in **Appendix 2. Map 1** shows riparian zones along Pine Creek and their condition. A more detailed description of Pine Creek's riparian vegetation is being prepared by zone Ecologist Sydney Smith (Modoc N.F.), and her information will supersede this initial classification and be included as **Appendix 4** to this document when it is written and distributed. Most of the prominent riparian areas are shown on **Map 1**, in the folder at the back of this report.

Improvement needs and alternatives

Watershed improvement needs (WIN) sites are plotted on **Map 1**. The numbered sites are further described on the worksheets included in **Appendix 3** and in the Forest's WIN inventory data base. In addition to the sites described on the worksheets, there are approximately 22 miles of type[3] C4 or C5 stream channels that could be improved by either (1) installing some major structures at the valley outlets or (2) By effectively combining additional or realigned fencing, altering grazing patterns, and manipulating vegetation, including grass, brush and riparian hardwoods. McCoy Flat and Champs Flat are problem areas that could benefit from raised streambeds and increased vegetative cover along streambanks. Litter accumulation is poor in most of the valley bottom riparian areas downstream from Highway 44, especially outside of the near-channel sedge mats. Outside the sedge zone, bunchgrasses and Shorthair sedge patches are pedestaled 2 to 4 inches above the present soil surface, with no litter cover protecting the exposed soil between tussocks. Some sheet erosion is occurring around the valley margins, but most rangeland sediment appears to be trapped by the sedge mats along the creek, except in sections of Champs Flat and McCoy flat where sedges are too sparse (or limited to dry streambeds) to provide any filtering effect. Forage utilization must be lessened by reducing numbers of livestock or their grazing period, to gradually improve litter accumulation, soil cover and humus content, and to improve infiltration capacity.

Upper Pine Creek (upstream from Pine Creek Valley)

There are few problems at present above Highway 44. Aside from the minor improvements noted on **Map 1** and detailed in **Appendix 3**, an additional problem is the potential for a "blowout" of the C6 reaches on private land at Stephens Meadows. Pine Creek's channel presently has excellent channel form and sinuosity there, but the vegetation supporting those conditions is overutilized. Bank vegetation is close-cropped, with a large component of shallow-rooted forbs and wildflowers, and there are no willows or tall grass to continue tying the banks together with roots. There are no hardwoods along the creek as it passes through the ranch. An alternative would be to invite the landowner to participate in the CRMP. Some method besides-season long grazing would better protect the channel and riparian area in Stephens Meadows.

Pine Creek Valley

There are several conditions in Pine Creek Valley that could be improved. Riparian hardwood stands in Martin Creek are declining in vigor, and the aspen groves need to be cut and/or burned and fenced to foster resprouting of young trees and protect them from livestock. The area around McKenzie Cow Camp, just upstream from Highway 44, is in generally good shape. The channel banks are mostly stable, and the aspen and willow stands are sufficient for good regeneration, with proper grazing management. Aspen suckers would benefit from reduced livestock browsing.

Harvey Valley, Little Harvey Valley and Logan Springs

Aspen stands occur in the Aspen Flat area. Logan Springs is a series of intermittent springs that emerge from the base of a lava flow that ends just short of Pine Creek. The aspen stand around Logan Springs covers over 40 acres. There are numerous one to five acre patches of aspen around the south sides of Harvey and Little Harvey Valleys, presumably fed by springs receiving seepage from Crater Mountain and Crater Lake. Most of these stands are used as resting areas by cattle, and they heavily browse aspen sprouts every year. Exclosure fencing may be necessary on some stands to insure survival. Such fencing would be suitable as KV projects for nearby timber sales in many cases. Some money has been collected in previous timber sales for improvements in the Aspen Flat area.

Recent improvements in the Harvey Valley area include 1988 work that obliterated approximately six miles of road that crossed the middle of Harvey and Little Harvey Valleys. Several old drainage ways that led from that road's ditches were blocked by loose rock gully plugs. Channel erosion at the confluence where Shoestring Draw joins Harvey Valley's main drainage was improved in 1988 by installing a headcut stabilizing structure and several loose rock and gabion checkdams. In 1989, diking is planned for the confluence area where Harvey and LIttle Harvey Valleys' drainage joins Pine Creek. The culvert crossing and

3. Refer to **Appendix 6,** Pine Creek channel type maps.

turnpike over Pine Creek will be removed, and the excavated outlet ditch between Little Harvey Valley's outlet and Pine Creek will be dammed and plugged, to restore Little Harvey Valley's natural outlet elevation and to disperse drainage water down its historic path to Pine Creek.

While the Harvey Valley allotment is administered under a rest-rotation grazing system, the permit holder has been allowed to graze the "rest" pasture at the end of the season in several recent drought years. This practice is directly contrary to the intent of the allotment's grazing system, and it results in heavily grazed riparian vegetation that would normally have remained along the creek to protect the channel from flood flows.

Champs Flat

Champs Flat has extensive areas of bare soil and active channel erosion along more than three miles of stream. Sheet erosion is occurring on the flat, with most bunchgrass and sedge patches on pedestals. Vegetative improvement may be limited by a clay layer in the valley soil, but most of the area's problems are due to season long cattle grazing. Water table levels could be quickly raised on more than 500 acres by constructing a single, six to eight foot high "drop" structure across Pine Creek at the downstream end of the flat, but the structure would cost more to build than the total value of the land and the cattle that graze on it.

A number of water holes have been excavated in the streambed in the lower end of Champs Flat. Several sites between Champs Flat and McCoy flat are old railroad grade location problems that could be improved; they are shown on **Map 1.**

Long term management should aim to accumulate some organic matter on the soil everywhere on Champs Flat, especially in the riparian zone along Pine Creek. Gradual improvements in sedge and grass cover along the main channel would eventually raise the streambed elevation and the local water table on at least some of the flat. *More grass stems and other riparian vegetation should be left along the Pine Creek channel in the fall, to foster sandbar formation and to improve the resistance of banks to erosion by hgh flows.*

The main form of channel damage in Champs Flat is overactive meandering and sidecutting. The stream has cut down between three feet and six feet across much of the flat. Flows are now too channelized, and they are eroding the streambanks. If the channel bottom had a better sedge mat cover, it would likely be incised only around three to four fee; flood flows would be less damaging because of improved dispersal over the floodplain; and some additional water storage could be realized from a raised water table. *The desired future channel condition in Champs Flat is to have a sedgy main channel, with peak flows spreading widely across the flat.*

McCoy Flat

Grazing in the McCoy Flat area has been season long for many years. Most of McCoy Flat (except where drainage from Prison Springs supports grass and sedges) is now dominated by sagebrush, with only a minor, widely scattered grass component. There are also widely-scattered patches of Shorthair sedge (*Carex exerta*) on the flat that are gradually breaking up and dying.

Little or no riparian vegetation remains at the end of the season, except for some short sedge stubble on some sections of the banks and streambed. The flat is being damaged by an over-incised channel and too much confinement of flood flows. The creek regularly floods outside of approximately 1/2 mile of channel at the upstream end of the flat. It only floods above the remaining 1.3 miles of incised channel on rare occasions.

Pine Creek has downcut over eight feet below the old floodplain in places, and over a mile of channel is much deeper than it should be. Where sedges have formed a mat in the channel bottom, the streambed is raising toward the old floodplain level. The channel seems to have the potential to rise to its old floodplain, if we can leave some riparian vegetation on the streambed and banks to promote entrapment of sediment to rebuild the streambed. *The management goal here should be to raise the streambed enough to force flood flows to regularly spread out over the old floodplain.*

An alternative would be to dam the valley outlet, to create a large, shallow wetland or a deeper lake. A wetland would trap sediment, raise the streambed, and improve shoreline forage and waterfowl habitat, but it would also be very expensive and could impede future fish passage.

Lower Pine Creek (below McCoy Flat)

The aspen-dominated, riparian woodland just upstream from County Road A1 is a significant feature in the Lower Pine Creek area. The aspen thrive in a multi-storied woodland in a 100 + acre flat with deep, sandy soil. Here, Pine Creek issues from a rocky canyon and spreads out during flood periods, before it returns to a basalt bedrock channel just above the highway. Cattle pass through this area, but grass and most of the aspen sprouts have been only lightly grazed. The woodland is healthy, although there has been considerable felling of old aspens by woodcutters. The remainder of the channel down to Eagle Lake is well armored by basalt, except for a 0.4 mile, nearly flat reach with a sandy streambed. A scattered aspen stand occurs on both sides of the creek, just upstream from the bridge near the fish trap. Those aspen are growing in a rough, rocky site. They are browsed by cattle, but not all sprouts have been destroyed.

Coordinated resource management planning effort

The Pine Creek watershed is presently the subject of an ongoing Coordinated Resource Management Planing (CRMP) Effort, begun in 1987. Participants in the effort to improve Pine Creek include the Forest Service, California Department of Fish and Game, Lahontan Regional Water Quality Control Board, County Agricultural Extension Office, Soil Conservation Service, Bureau of Land Management, Cal Trout, four or five grazing permit holders, and the Audubon Society. In addition to defining common goals and strategies, the group has encouraged some improvements and discouraged other proposals. They have endorsed non-structural, long term improvements and tried to avoid expensive, "quick fixes" to long term land management problems.

A copy of the 1988 CRMP agreement is included as **Appendix 5** to this report. The group members developed the following objectives for Pine Creek:

- By 1990, implement grazing management systems (that) provide for riparian enhancement and restoration.

- Beginning in 1988, complete rehabilitation plans for the Logan Springs, Champs and McCoy segments of Pine Creek at the rate of one per year. Start work by the following year.

- By August, 1988 design and begin a monitoring results of Coordinated Resource Management in Pine Creek.

- Develop an annual work program by April 1 to schedule short and long range project work.

Conclusions and Recommendations

A sustained, long term land management effort is needed to reverse the effects of over a century of season long livestock grazing and over 50 years of road and railroad building in the Pine Creek watershed. Some improvements, including the obliteration of the Harvey Valley road and repair of headcuts near Shoestring Draw were already accomplished in 1988. Others, including the removal of several crossings and the obliteration of some railroad grades will be done in the near future, and some will not happen for a while

For example, removal of the Western Pacific railroad grade, to allow natural meandering in upper Pine Creek Valley will probably not be feasible until that railroad line is abandoned.

Recommendations

Appropriate, <u>immediate goals</u> for improving the Pine Creek watershed are to:

- Immediately apply range management measures in the watershed's grazing allotments, that emphasize desired future conditions of improved ground cover, healed streambanks, and raised water tables,
- Finish recommended WIN projects,
- Restore riparian woodlands and emphasize riparian hardwoods where they can grow and survive.
- Investigate the possibilities of a land exchange for the Stephens Meadow parcel on upper Pine Creek, to protect and improve its outstanding fishery and riparian habitat potential and to reduce livestock impacts.

Suitable, <u>longer term goals</u> would be:

- To prolong downstream, intermittent streamflow, so Pine Creek flows at least a trickle for 35-40% of the time. That flow period could be lengthened as overall watershed conditions improve, especially water table and underground storage conditions in the middle areas of the watershed.
- To improve channel conditions, by rebuilding banks, by fostering natural meandering, and by leaving more vegetation along the banks.
- To gradually close up the Pine Creek's main channel. from the present swale shape (Rosgen C4/C5) to a more productive meandering, grass-edged slot for low flows (Rosgen C6) where it is practicable to do so.

References and Notes

[1] Raymond Vail & Assoc., 1979. Eagle Lake basin planning study; Vol. 4: Hydrology. Sacramento, CA: Raymond Vail Assoc. 31p. Copies available from the Lassen County public library, from the Lassen County Planning Office, and some copies are available for examination at Susanville, CA offices of the Forest Service and Bureau of Land Management.

[2] Ibid, p 4.

[3] Ibid, pp 21-26.

[4] Eagle Lake has no natural outlet. Water is lost through evaporation, seepage through the plugged Bly Tunnel, and to groundwater outflow. The lake's level reached 5,110.5 in 1986, but it dropped to 5,101 after several drought years.

[5] The X-axis is plotted as "downvalley" distance in miles, to better describe land form. Actual channel distances are considerable longer, because of meandering across the flatter valley floors.

[6] Purdy, Tim I. 1988. Purdy's Eagle Lake. Susanville, CA: Lahontan Images. 136p., inc photos and maps.

[7] Based on records of past use kept in the Eagle Lake Ranger District files, this level of use is typical of the last 50 years on most of those allotments. Numbers were 20% higher in some years in the 1940's, but only for a year or two.

[8] Historical information on grazing levels is based on notes in the Eagle Lake Ranger District's grazing allotment files.

[9] Railroad line dates are taken from an old atlas of railroad lines and old timber sales that is kept in the Forest Archaeologist's office, Lassen National Forest, Susanville, CA.

[10] USGS Station no. 10359300. Flows have been measured there since 1959.

[11] USGS Station no. 10359250. Flows were measured there from 1949 to 1961.

Appendix 1--Pine Creek riparian types (mapping codes)

Map code	Type	Description
LPF	Lodgepole flats	Dominant vegetation is lodgepole pine, primarily in sapling or pole sizes. An under story of sedges may be present.
AWR	Aspen on rocky rocky benches in the streamside management zone or near springs or seeps	Aspen woodland on rocky benches near streams or springs. Willows may be there. Grass understory may also be present.
AWS	Aspen-willow-grass on flatter, better developed soils	Aspen woodland with grass understory. Willow patches may occur. May be dense stands or a savannah condition.
ASS	Aspen-grass-sage	Aspen woodland on sandy-soiled floodplain containing type C stream.
SGS	Sedgy swale in channel or along streamside zone	Several species of sedge along bottom & near stream area. Dense grass stands on adjoining floodplains, with sagebrush on the fringes.
GFF	Grass-forb floodplain	Grass-forb "turf" cover on floodplain, with entrenched main channel.
WS	Willow-streambed complex	Willow stand growing in boulder stream channel, e.g. McCoy flat inlet "chute" in Pine Creek.
SS	Sedge-grass on bars	Areas with grass or sedge growing abundantly only in the channel or on

		streambanks.
SM	Spring fed wet meadow	Dense sedge-grass meadow, either seeping water or "floating" on subsurface water.

Appendix 2--Riparian zone condition codes

Map code	Meaning	Description
+	Good condition	Riparian vegetation is regenerating well, with with a good vegetative cover on soils of banks & nearby floodplains.
0	Fair condition	Riparian overstory is stable, but regeneration is occurring, although it has been hindered by livestock grazing. More soil is exposed.
-	Poor condition	Riparian vegetation is in retreat; regeneration is not occurring, either because of present browsing or poor soil condition. Soil cover effect is sparse. No litter or other organic material being left

Appendix 3--Watershed improvement needs

Watershed improvement needs are described on watershed condition inventory worksheets, for entry into the computerized WIN inventory system. Copies of the worksheets for identified projects are enclosed as part of this appendix.

WATERSHED IMPROVEMENT NEEDS
TOTAL NEEDS by FOREST and RANGER DISTRICT
LASSEN NF
DISTRICT: 58

WATERSHED CODE		PROJECT NAME	SITE CATEGORY	DIST	STE CON	STM CLS	BENE USES	TRMT PRO	EST STRUCTS SE	SC	SS	FI	EST ACRES	EST RIP ACRES	P R	EST $	FUND TYPES	S R	WS $	FY RQ
1808C003C4	00A	32N22 XING	10 16 18	ROAD	DEC	I	COLD	60 80	00	00	00	01	2.0	2.0	H	20000	C		0	91
1808C003C4	00A	ANTELOPE V. RR GRADE	02 05 09	HYDR	DEC	III	AGR	20 00	00	01	00	00	40.0	40.0	H	2000	C F F		0	91
1808C00304	00A	CHAMPS-MCCOY RR #1	03 05 09	DIST	DEC	I	AGR	20 40	00	01	00	00	1.0	1.0	H	1000	L F F		1000	91
1808C00304	00A	CHAMPS-MCCOY RR #2	03 05 09	DIST	DEC	I	AGR	20 40	00	01	00	00	1.0	1.0	H	1000	L F F		1000	91
1808000304	00A	REMNANT ASPEN STAND	03 21 00	GRAZ	DEC	I	AGR	10 90	00	00	01	00	0.2	0.2	H	2000	D C C		0	91
1808000304	00A	RR GRADES @ LOGAN SP	02 09 00	DIST	CON	I	MIGR	20 60	00	02	00	00	5.0	5.0	H	2000	F C C		2000	91
1808CC03C4	00A	VIC. LIL' ANT. WELL	02 06 00	HYDR	DEC	III	AGR	30 00	00	01	00	00	2.0	2.0	H	2000	D F F		0	91
TOTALS FOR FY 91:													51.2	51.2		30000			4000	
1808C00304	00A	BOGARD SPR @ 22 ROAD	10 00 00	ROAD	CON	II	FRSH	60 90	00	01	00	00	0.2	0.2	L	5000	L C C		0	92
1808C00304	00A	CRATER RR GRADE	03 04 09	DIST	DEC	I	FRSH	40 60	00	01	00	00	160.0	160.0	H	5000	F D D		1000	92
1808C00304	00A	LEAKY LOUIE'S POND	16 17 00	HYDR	CON	I	COLD	80 00	00	00	00	01	20.0	20.0	H	20000	L C C		0	92
1808CC03C4	00A	VIC. LOGAN SPRINGS	04 14 00	DIST	CON	III	WILD	40 00	00	00	00	00	0.1	0.1	L	2000	D C C		0	92
TOTALS FOR FY 92:													180.3	180.3		32000			1000	
1808C00304	000	MCKENZIE COW CAMP	02 03 05	HYDR	CON	I	COLD	30 90	04	00	00	00	40.0	40.0	L	20000	F C C		0	93
TOTALS FOR FY 93:													40.0	40.0		20000			0	
1808C00304	00A	LC 105 RD. XING	02 03 00	ROAD	CON	I	AGR	40 00	00	01	00	00	500.0	40.0	L	20000	L C C		0	99
1808C00304	00A	REACH ABOVE 22 XING	01 03 16	SILV	CON	I	COLD	90 60	00	00	00	00	2.0	2.0	H	2000	F C C		0	99
1808CC03C4	00A	WP RR GRADE @ HWY 44	02 03 00	DIST	DEC	I	AGR	40 60	00	01	00	00	2000.0	200.0	H	20000	L C C		20000	99
TOTALS FOR FY 99:													2502.0	242.0		42000			20000	

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT	1. FOREST: 06--Lassen	
	2. DISTRICT: 58--Eagle Lake	3. SITE NAME: Leaky Louie's Pond

***** I LOCATION *****

4. State	5. NFS watershed code	6. Sub-watershed code
06--CA	1808000304 (Eagle Lake basin)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
021 (Cone MA)		055 (Silver Lake)	PC-1

***** II SITE CONDITION *****

11. Site Category (circle those that are appropriate)

01	Debris clogged channel	12	Abandoned system trail
02	Lake or stream bank erosion	13	Abandoned mines
03	Damaged riparian	14	Abandoned barrow pits
04	Damaged meadows	15	Fire damaged areas
05	Gully erosion	**16	Reduced quality spawning habitat
06	Sheet/rill erosion	**17	Reduced quantity spawning habitat
07	Mass wasting	18	Reduced quality rearing habitat
08	Soil compaction	19	Reduced quantity rearing habitat
09	Abandoned road	20	Reduced wildlife cover
10	Damaged system road	21	Reduced dead and down material
11	Abandoned trail	22	Reduced wildlife forage

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
GRAZ = Damage caused by cattle or sheep grazing programs
** HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
** ROAD = System and nonsystem roads, roadcuts, and fill slopes
SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

DEC = Declining (Class III)
** CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)	14. Stream class (cirle choice below)
YES / NO --No	Class: I,II,III,IV --I

15. Beneficial uses (cirle those that are appropriate)

MUN = Municipal and domestic supply	GWR = Ground water recharge
AGR = Agricultural supply	POW = Hydropower generation
REC2 = Water non contact	REC1 = Water contact rec
WILD = Wildlife habitat	BIOL = Special biol. signif. area
FSS = Forest Service sensitive species	T&ES = State listed T&E species
T&EF = Federally Listed Threatened and Endangered species	
RARE = Preservation of Rare and Endangered species	
** COLD = Cold/fresh water habitat	** SPWN = Fish spawning
** SPTF = Instream sport fishing	** WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

10	Erosion control: nonstructural	60	Channel clearing
20	Erosion control: structural	70	Soil productivity enhancement
30	Erosion control: non & structural	** 80	Structural fisheries habitat improvement
40	Road obliteration	90	Nonstructural fisheries hab. improvements
50	Pollution abatement		

17. Priority high, mod, low	18. Est. acres	18a. Est. rip. acres	19. NO. structures
M	20.0 IN .10	20.0	1

- SKETCH

...Correct fish passage problem due to elevated culvert outlets, by either constructing a new culvert on grade or by building a couple of "jump" pools below the culverts

-Township & Range-

T31N | R7E

Section:NW1/4,NW1/4 Sec 23

Project:

KEY

SCALE

Date:

Drawn by:

20. Estimated Total Cost
INITIAL EST.
$ 20,000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%
Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

Prepared by (signature)

Date: / /

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT

1. FOREST: 06--Lassen

2. DISTRICT: 58--Eagle Lake

3. SITE NAME: Reach above 22 Rd. Xing

***** I LOCATION *****

4. State	5. NFS watershed code	6. Sub-watershed code
06--CA	1808000304 (Eagle Lake basin)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
021 (Cone MA)		063 (Upper Pine Creek)	PC-2

***** II SITE CONDITION *****

11. Site Category (circle those that are appropriate)

**	01	Debris clogged channel	12 Abandoned system trail
	02	Lake or stream bank erosion	13 Abandoned mines
**	03	Damaged riparian	14 Abandoned barrow pits
	04	Damaged meadows	15 Fire damaged areas
	05	Gully erosion	** 16 Reduced quality spawning habitat
	06	Sheet/rill erosion	17 Reduced quantity spawning habitat
	07	Mass wasting	18 Reduced quality rearing habitat
	08	Soil compaction	19 Reduced quantity rearing habitat
	09	Abandoned road	** 20 Reduced wildlife cover
	10	Damaged system road	21 Reduced dead and down material
	11	Abandoned trail	22 Reduced wildlife forage

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
GRAZ = Damage caused by cattle or sheep grazing programs
HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
ROAD = System and nonsystem roads, roadcuts, and fill slopes
** SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

DEC = Declining (Class III)
** CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)

YES / NO --No

14. Stream class (cirle choice below)

Class: I,II,III,IV --I

15. Beneficial uses (cirle those that are appropriate)

	MUN	= Municipal and domestic supply	GWR = Ground water recharge
**	AGR	= Agricultural supply	POW = Hydropower generation
	REC2	= Water non contact	** REC1 = Water contact rec
**	WILD	= Wildlife habitat	BIOL = Special biol. signif. area
	FSS	= Forest Service sensitive species	T&ES = State listed T&E species
	T&EF	= Federally Listed Threatened and Endangered species	
	RARE	= Preservation of Rare and Endangered species	
**	COLD	= Cold/fresh water habitat	** SPWN = Fish spawning
**	SPTF	= Instream sport fishing	** WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

10	Erosion control: nonstructural	**60	Channel clearing
20	Erosion control: structural	70	Soil productivity enhancement
30	Erosion control: non & structural	80	Structural fisheries habitat improvement
40	Road obliteration	**90	Nonstructural fisheries hab. improvements
50	Pollution abatement		

17. Priority high, mod, low	18. Est. acres	18a. Est. rip. acres	19. NO. structures
M	2.0 IN .10	2.0	

- SKETCH

- NOTE: THIS SITE IS NOW ON PRIVATE LAND. It is a damaged 100 yard reach of Pine Creek, located 200 feet upstream from the 32N22 crossing. Nearly all the riparian hardwoods (aspen) were felled in the SMZ, and a large amount of woody debris (mainly tree trunks) were left on the ground in the SMZ. Approx. 100 yards of streambed are exposed to full sunlight most of the day. The streambed cobbles are covered by a large mat of algae. The algae quickly disappears from the streambed downstream from the culvert, when the creek is shaded again. The open stretch of water is also beling heated, but light is probably the major factor. PC-2 and PC-3 together probably account for the somewhat elevated winter and early spring nitrate levels measured in 1986 at the old Bogard gauging station site. The remedy for PC-3 would be to clear out the debris and foster aspen regrowth, while excluding cattle on 2-3 acres.

-Township & Range-

T31N R8E

Section: NWNE Sec. 8

Project:

KEY

SCALE

Date:

Drawn by:

20. Estimated Total Cost
INITIAL EST.
$ 2,000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%

Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

Prepared by (signature)

Date: / /

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT	1. FOREST: 06 (Lassen)	
	2. DISTRICT: 58 (Eagle Lake)	3. SITE NAME: 32N22 Xing

******* I LOCATION *******

4. State	5. NFS watershed code	6. Sub-watershed code
06 (CA)	1808000304 (Eagle Lake basin)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
021 (Cone MA)		063 (Upper Pine Cr.)	PC-3

******* II SITE CONDITION *******

11. Site Category (circle those that are appropriate)

	01	Debris clogged channel	
	02	Lake or stream bank erosion	
	03	Damaged riparian	
	04	Damaged meadows	
	05	Gully erosion	
	06	Sheet/rill erosion	
	07	Mass wasting	
	08	Soil compaction	
	09	Abandoned road	
**	10	Damaged system road	
	11	Abandoned trail	
	12	Abandoned system trail	
	13	Abandoned mines	
	14	Abandoned barrow pits	
	15	Fire damaged areas	
**	16	Reduced quality spawning habitat	
**	17	Reduced quantity spawning habitat	
**	18	Reduced quality rearing habitat	
	19	Reduced quantity rearing habitat	
	20	Reduced wildlife cover	
	21	Reduced dead and down material	
	22	Reduced wildlife forage	

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
GRAZ = Damage caused by cattle or sheep grazing programs
HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
** ROAD = System and nonsystem roads, roadcuts, and fill slopes
SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

** DEC = Declining (Class III)
CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)	14. Stream class (cirle choice below)
YES / NO --No	Class: I,II,III,IV --I

15. Beneficial uses (cirle those that are appropriate)

	MUN	= Municipal and domestic supply	GWR = Ground water recharge
**	AGR	= Agricultural supply	POW = Hydropower generation
**	REC2	= Water non contact	** REC1 = Water contact rec
**	WILD	= Wildlife habitat	BIOL = Special biol. signif. area
	FSS	= Forest Service sensitive species	T&ES = State listed T&E species
	T&EF	= Federally Listed Threatened and Endangered species	
	RARE	= Preservation of Rare and Endangered species	
**	COLD	= Cold/fresh water habitat	** SPWN = Fish spawning
**	SPTF	= Instream sport fishing	** WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

10	Erosion control: nonstructural	** 60	Channel clearing
20	Erosion control: structural	70	Soil productivity enhancement
30	Erosion control: non & structural	** 80	Structural fisheries habitat improvement
40	Road obliteration	90	Nonstructural fisheries hab. improvements
50	Pollution abatement		

17. Priority high, mod, low	18. Est. acres	18a. Est. rip. acres	19. NO. structures
H	2.0 IN .10	0.2	1

- SKETCH

Low flows are routed through the wrong pipe (i.e. through the small one, instead of the large one in the main channel). Suggest welding a piece of metal across the lower 6" of the smaller culvert's inlet, to force 100% of the low flows through the main pipe. Fish passage was recently improved by adding galvanized troughs with baffles to the culvert outlets, but that setup will not pass fish during high flow periods. Consider a KV or purchaser credit road reconstruction project to build a raised outlet pool, to promote fish passage at all flow levels.

Drainage from over an acre of road runs directly into Pine Creek at the crossing. Need to reconstruct approx. 1/4 mile of road to reduce direct drainage into the creek, by either installing rolling dips or by regrading the road into a high crown, to get water off the road immediately, instead of flowing toward the creek.

-Township & Range-

T31N | R8E

Section: NWSW Sec. 5

Project:	KEY	SCALE
Date:		
Drawn by:		

20. Estimated Total Cost

INITIAL

$ 20,000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%

Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

Prepared by (signature) Date: / /

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT	1. FOREST: 06 (Lassen)	
	2. DISTRICT: 58 (Eagle Lake)	3. SITE NAME: McKenzie Cow Camp vic.

******* I LOCATION *******

4. State	5. NFS watershed code	6. Sub-watershed code
06 (CA)	1808000304 (Eagle Lake basin)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
023 (Campbell MA)		063 (Upper Pine Creek)	PC-4

******* II SITE CONDITION *******

11. Site Category (circle those that are appropriate)

	01	Debris clogged channel	12 Abandoned system trail
**	02	Lake or stream bank erosion	13 Abandoned mines
**	03	Damaged riparian	14 Abandoned barrow pits
	04	Damaged meadows	15 Fire damaged areas
**	05	Gully erosion	** 16 Reduced quality spawning habitat
	06	Sheet/rill erosion	17 Reduced quantity spawning habitat
	07	Mass wasting	** 18 Reduced quality rearing habitat
	08	Soil compaction	** 19 Reduced quantity rearing habitat
	09	Abandoned road	20 Reduced wildlife cover
	10	Damaged system road	21 Reduced dead and down material
	11	Abandoned trail	** 22 Reduced wildlife forage

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
** DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
** GRAZ = Damage caused by cattle or sheep grazing programs
** HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
ROAD = System and nonsystem roads, roadcuts, and fill slopes
SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

DEC = Declining (Class III)
** CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)	14. Stream class (cirle choice below)
YES / NO --Yes	Class: I,II,III,IV --I

15. Beneficial uses (cirle those that are appropriate)

	MUN = Municipal and domestic supply	**	GWR = Ground water recharge
**	AGR = Agricultural supply		POW = Hydropower generation
	REC2 = Water non contact		REC1 = Water contact rec
**	WILD = Wildlife habitat		BIOL = Special biol. signif. area
	FSS = Forest Service sensitive species		T&ES = State listed T&E species
	T&EF = Federally Listed Threatened and Endangered species		
	RARE = Preservation of Rare and Endangered species		
	COLD = Cold/fresh water habitat	**	SPWN = Fish spawning
	SPTF = Instream sport fishing	**	WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

10	Erosion control: nonstructural	60	Channel clearing
** 20	Erosion control: structural	70	Soil productivity enhancement
** 30	Erosion control: non & structural	** 80	Structural fisheries habitat improvement
40	Road obliteration	** 90	Nonstructural fisheries hab. improvements
50	Pollution abatement		

17. Priority high, mod, low	18. Est. acres	18a. Est. rip. acres	19. NO. structures
L	40.0 IN .10	40.0	4 surf. (ck dms)

- SKETCH

- The riparian zone above McKenzie Cow Camp includes several alternate channels that have downcut 3 to 4 feet in places, because of old irrigation efforts. Wiers and ditch lines have gullied in places. The ditches were intended to better irrigate the pastures upstream from the horse corrall and barns. Willows were burned back a decade ago, to increase the amount of grassland for forage. Grass cover is generally excellent, and the willows are vigorous, if somewhat hedged by cattle around the edge of clumps of willows. The rangeland here is non-brittle and would immediately benefit from shorter utilization periods. A few channel barriers, either log dams or rock/gabion structures should reverse the effects of the downcut irrigation ditches.

-Township & Range-

T31N | R8E

Section:NWSW Sec. 4

Project:	KEY	SCALE
Date:		
Drawn by:		

20. Estimated Total Cost
INITIAL
$ 20,000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%
Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

Prepared by (signature) | Date: / /

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT	1. FOREST 06 (Lassen)	
	2. DISTRICT 58 (Eagle Lake)	3. SITE NAME Crater RR grade

******* I LOCATION *******

4. State	5. NFS watershed code	6. Sub-watershed code
06 (CA)	180800304 (Eagle Lake basin)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
023 (Campbell MA)		063 (Upper Pine Creek)	PC-5

******* II SITE CONDITION *******

11. Site Category (circle those that are appropriate)

	01	Debris clogged channel	12 Abandoned system trail
	02	Lake or stream bank erosion	13 Abandoned mines
**	03	Damaged riparian	14 Abandoned barrow pits
**	04	Damaged meadows	15 Fire damaged areas
	05	Gully erosion	16 Reduced quality spawning habitat
	06	Sheet/rill erosion	17 Reduced quantity spawning habitat
	07	Mass wasting	18 Reduced quality rearing habitat
	08	Soil compaction	19 Reduced quantity rearing habitat
**	09	Abandoned road	20 Reduced wildlife cover
	10	Damaged system road	21 Reduced dead and down material
	11	Abandoned trail	22 Reduced wildlife forage

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
** DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
GRAZ = Damage caused by cattle or sheep grazing programs
HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
** NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
** ROAD = System and nonsystem roads, roadcuts, and fill slopes
SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

** DEC = Declining (Class III)
CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)	14. Stream class (cirle choice below)
YES / NO --Yes	Class: I,II,III,IV --I

15. Beneficial uses (cirle those that are appropriate)

	MUN	= Municipal and domestic supply	GWR = Ground water recharge
**	AGR	= Agricultural supply	POW = Hydropower generation
	REC2	= Water non contact	REC1 = Water contact rec
**	WILD	= Wildlife habitat	BIOL = Special biol. signif. area
	FSS	= Forest Service sensitive species	T&ES = State listed T&E species
	T&EF	= Federally Listed Threatened and Endangered species	
	RARE	= Preservation of Rare and Endangered species	
	COLD	= Cold/fresh water habitat	** SPWN = Fish spawning
	SPTF	= Instream sport fishing	WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

10	Erosion control: nonstructural	** 60	Channel clearing
** 20	Erosion control: structural	70	Soil productivity enhancement
30	Erosion control: non & structural	80	Structural fisheries habitat improvement
** 40	Road obliteration	** 90	Nonstructural fisheries hab. improvements
50	Pollution abatement		

17. Priority high, mod, low	18. Est. acres	18a. Est. rip. acres	19. NO. structures
M	160.0 IN .10	160.0	1 (remove)

- SKETCH

-The old railroad grade blocks Pine Creek from flowing through 2/3 of the vallley floor in this area. Meandering is limited by the grade, and flows are concentrated through the -gap in the middle of the grade, where a trestle once bridged the creek. Some of the grade's old borrow pits are now good, season-long stockponds.

- Obliterating the grade would better spread flood flows over the valley floor, and Pine -Creek's sinuosity would be promoted. Meandering would resume.

-

-Township & Range-

T31N | R8E

Section: NWSW Sec. 1

Project:	KEY	SCALE
Date:		
Drawn by:		

20. Estimated Total Cost
INITIAL
$ 5000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%
Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

Prepared by (signature) | Date: / /

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT	1. FOREST 06 (Lassen)	
	2. DISTRICT 58 (Eagle Lake)	3. SITE NAME 105 Rd. Xing

***** I LOCATION *****

4. State	5. NFS watershed code	6. Sub-watershed code
06 (CA)	1808000304 (Eagle Lake basin)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
019 (Crater MA)		038 (Lower Pine Creek)	PC-6

***** II SITE CONDITION *****

11. Site Category (circle those that are appropriate)

	01	Debris clogged channel	12 Abandoned system trail
**	02	Lake or stream bank erosion	13 Abandoned mines
**	03	Damaged riparian	14 Abandoned barrow pits
	04	Damaged meadows	15 Fire damaged areas
	05	Gully erosion	16 Reduced quality spawning habitat
	06	Sheet/rill erosion	17 Reduced quantity spawning habitat
	07	Mass wasting	18 Reduced quality rearing habitat
	08	Soil compaction	19 Reduced quantity rearing habitat
	09	Abandoned road	20 Reduced wildlife cover
	10	Damaged system road	21 Reduced dead and down material
	11	Abandoned trail	22 Reduced wildlife forage

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
GRAZ = Damage caused by cattle or sheep grazing programs
HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
** ROAD = System and nonsystem roads, roadcuts, and fill slopes
SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

DEC = Declining (Class III)
** CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)	14. Stream class (cirle choice below)
YES / NO --No	Class: I,II,III,IV --I

15. Beneficial uses (cirle those that are appropriate)

	MUN = Municipal and domestic supply	**	GWR = Ground water recharge
**	AGR = Agricultural supply		POW = Hydropower generation
	REC2 = Water non contact		REC1 = Water contact rec
**	WILD = Wildlife habitat		BIOL = Special biol. signif. area
	FSS = Forest Service sensitive species		T&ES = State listed T&E species
	T&EF = Federally Listed Threatened and Endangered species		
	RARE = Preservation of Rare and Endangered species		
	COLD = Cold/fresh water habitat	**	SPWN = Fish spawning
	SPTF = Instream sport fishing		WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

10	Erosion control: nonstructural	60	Channel clearing
20	Erosion control: structural	70	Soil productivity enhancement
30	Erosion control: non & structural	80	Structural fisheries habitat improvement
** 40	Road obliteration/ +reconstruction	90	Nonstructural fisheries hab. improvements
50	Pollution abatement		

17. Priority high, mod, low	18. Est. acres	18a. Est. rip. acres	19. NO. structures
L	500	40	1 surf
	IN .10		

- SKETCH

-The Lassen County road 105 crossing over Pine Creek is stable and well-located at a narrow place on the valley floor. Like the unused railroad crossings, this single set of culverts -in a cross-valley turnpike (formerly a RR crossing?) confines high water flows and limits meandering in that reach of Pine Creek. However, the Pine Creek Valley is narrow there -anyway, and the site should be a low priority for improvement now. If obliterating other RR grades proves to be beneficial, then this crossing should be reconstructed or removed.

-Township & Range-

T32N | R9E

Section: SW 1/4 Sec. 32

Project:	KEY	SCALE
Date:		
Drawn by:		

20. Estimated Total Cost
INITIAL
$ 20,000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%
Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

Prepared by (signature) | Date: / /

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT	1. FOREST: 06 (Lassen)	
	2. DISTRICT: 58 (Eagle Lake)	3. SITE NAME: Logan Springs vic.

******* I LOCATION *******

4. State	5. NFS watershed code	6. Sub-watershed code
06 (CA)	1808000304 (Eagle Lake basin)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
019 (Crater MA)		032 (Harvey Valley)	PC-7

******* II SITE CONDITION *******

11. Site Category (circle those that are appropriate)

	01	Debris clogged channel	12 Abandoned system trail
	02	Lake or stream bank erosion	13 Abandoned mines
	03	Damaged riparian	** 14 Abandoned barrow pits
**	04	Damaged meadows	15 Fire damaged areas
	05	Gully erosion	16 Reduced quality spawning habitat
	06	Sheet/rill erosion	17 Reduced quantity spawning habitat
	07	Mass wasting	18 Reduced quality rearing habitat
	08	Soil compaction	19 Reduced quantity rearing habitat
	09	Abandoned road	20 Reduced wildlife cover
	10	Damaged system road	21 Reduced dead and down material
	11	Abandoned trail	22 Reduced wildlife forage

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
** DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
GRAZ = Damage caused by cattle or sheep grazing programs
HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
** ROAD = System and nonsystem roads, roadcuts, and fill slopes
SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

DEC = Declining (Class III)
** CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)	14. Stream class (cirle choice below)
YES / NO --No	CIass: I,II,III,IV --III

15. Beneficial uses (cirle those that are appropriate)

	MUN = Municipal and domestic supply	**	GWR = Ground water recharge
**	AGR = Agricultural supply		POW = Hydropower generation
	REC2 = Water non contact		REC1 = Water contact rec
**	WILD = Wildlife habitat		BIOL = Special biol. signif. area
	FSS = Forest Service sensitive species		T&ES = State listed T&E species

T&EF = Federally Listed Threatened and Endangered species
RARE = Preservation of Rare and Endangered species
COLD = Cold/fresh water habitat — SPWN = Fish spawning
SPTF = Instream sport fishing — WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

	10	Erosion control: nonstructural	60 Channel clearing
	20	Erosion control: structural	70 Soil productivity enhancement
	30	Erosion control: non & structural	80 Structural fisheries habitat improvement
**	40	Road obliteration	90 Nonstructural fisheries hab. improvements
	50	Pollution abatement	

--Range betterment $? KV$?--

17. Priority	18. Est. acres	18a. Est. rip. acres	19. NO. structures
high, mod, low	IN .10		1 (remove surf.)
L	0.1	0.1	

- SKETCH

-Obliterate an old RR water pit/well. It is an exposed safety hazard, with rotting wood walls and support timbers. It is an usuable water source for most wildlife (except birds) -and livestock. Obliterate and fill-in the pit. Replace it with a spring development & trough at nearby Logan Springs--or with nothing, if we can keep water in nearby creek -pools, because of improved management practices.

-Township & Range-

T32N R9E

Section: NENE Sec. 8

Project:

KEY

SCALE

Date:

Drawn by:

20. Estimated Total Cost

INITIAL

$ 2000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%

Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

Prepared by (signature)

Date: / /

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT	1. FOREST: 06--Lassen	
	2. DISTRICT: 58--Eagle Lake	3. SITE NAME: RR Grades below Logan Sprs

******* I LOCATION *******

4. State	5. NFS watershed code	6. Sub-watershed code
06--CA	1808000304 (Eagle Lake Basin)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
013 (Ashurst MA)		032 (Harvey Valley)	PC8

******* II SITE CONDITION *******

11. Site Category (circle those that are appropriate)

	01	Debris clogged channel	12 Abandoned system trail
**	02	Lake or stream bank erosion	13 Abandoned mines
	03	Damaged riparian	14 Abandoned barrow pits
	04	Damaged meadows	15 Fire damaged areas
	05	Gully erosion	16 Reduced quality spawning habitat
	06	Sheet/rill erosion	17 Reduced quantity spawning habitat
	07	Mass wasting	18 Reduced quality rearing habitat
	08	Soil compaction	19 Reduced quantity rearing habitat
**	09	Abandoned road	20 Reduced wildlife cover
	10	Damaged system road	21 Reduced dead and down material
	11	Abandoned trail	22 Reduced wildlife forage

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
** DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
GRAZ = Damage caused by cattle or sheep grazing programs
HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
** ROAD = System and nonsystem roads, roadcuts, and fill slopes
SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

DEC = Declining (Class III)
** CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)	14. Stream class (cirle choice below)
YES / NO --Yes	Class: I,II,III,IV --I

15. Beneficial uses (cirle those that are appropriate)

	MUN	= Municipal and domestic supply	GWR = Ground water recharge
	AGR	= Agricultural supply	POW = Hydropower generation
	REC2	= Water non contact	REC1 = Water contact rec
	WILD	= Wildlife habitat	BIOL = Special biol. signif. area
	PSS	= Forest Service sensitive species	T&ES = State listed T&E species
	T&EF	= Federally Listed Threatened and Endangered species	
	RARE	= Preservation of Rare and Endangered species	
**	COLD	= Cold/fresh water habitat	** SPWN = Fish spawning
	SPTF	= Instream sport fishing	WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

	10 Erosion control: nonstructural	** 60	Channel clearing
**	20 Erosion control: structural	70	Soil productivity enhancement
	30 Erosion control: non & structural	80	Structural fisheries habitat improvement
	40 Road obliteration	90	Nonstructural fisheries hab. improvements
	50 Pollution abatement		

17. Priority	18. Est. acres	18a. Est. rip. acres	19. NO. structures
M	5	5	2 (Chan. Stab.)
high, mod, low	IN .10		

- SKETCH

- Problem consists of two old railroad grades, downstream from Logan Springs, but upstream from the confluence with the stream draining the Harvey Valley subbasins. The banks
- are well vegetated, but the embankments have accentuated the constricting effect of the valley outlet. Flood flows have been narrowed and accelerated through the gaps in the
- two RR grades (approx. 100 yds apart), resulting in downcutting and a sequence of deep scour pools in the channel. The pools do provide some wildlife benefits now, but the
- area should be stabilized, either by using the old grades as abutments for gabion check dams or by removing all railroad fill material from the Pine Creek floodplain.
- The checkdam solution would reduce velocitiy of flood flows by further flattening the gradient, but they could become another long term maintenance problem.
- Recommend channel clearing as the preferred solution, considering economics and simplicity.

-Township & Range-

T32N | R9E

Section: NESE Sec 5

Project:

KEY

SCALE

Date:

Drawn by:

20. Estimated Total Cost

$ INITIAL 2,000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%

Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

Prepared by (signature)

Date: / /

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT	1. FOREST: 06 (Lassen)	
	2. DISTRICT: 58 (Eagle Lake)	3. SITE NAME: Little Antelope well vic.

******* I LOCATION *******

4. State	5. NFS watershed code	6. Sub-watershed code
06 (CA)	1808000304 (Eagle Lake basin)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
019 (Crater MA)		038 (Lower Pine Creek)	PC-9

******* II SITE CONDITION *******

11. Site Category (circle those that are appropriate)

	01	Debris clogged channel	12 Abandoned system trail
**	02	Lake or stream bank erosion	13 Abandoned mines
	03	Damaged riparian	14 Abandoned barrow pits
	04	Damaged meadows	15 Fire damaged areas
	05	Gully erosion	16 Reduced quality spawning habitat
**	06	Sheet/rill erosion	17 Reduced quantity spawning habitat
	07	Mass wasting	18 Reduced quality rearing habitat
	08	Soil compaction	19 Reduced quantity rearing habitat
	09	Abandoned road	20 Reduced wildlife cover
	10	Damaged system road	21 Reduced dead and down material
	11	Abandoned trail	22 Reduced wildlife forage

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
** GRAZ = Damage caused by cattle or sheep grazing programs
** HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
ROAD = System and nonsystem roads, roadcuts, and fill slopes
SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

** DEC = Declining (Class III)
CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)	14. Stream class (cirle choice below)
YES / NO --yes	Class: I,II,III,IV --IV

15. Beneficial uses (cirle those that are appropriate)

	MUN	= Municipal and domestic supply	GWR = Ground water recharge
**	AGR	= Agricultural supply	POW = Hydropower generation
	REC2	= Water non contact	REC1 = Water contact rec
	WILD	= Wildlife habitat	BIOL = Special biol. signif. area
	FSS	= Forest Service sensitive species	T&ES = State listed T&E species
	T&EF	= Federally Listed Threatened and Endangered species	
	RARE	= Preservation of Rare and Endangered species	
	COLD	= Cold/fresh water habitat	SPWN = Fish spawning
	SPTF	= Instream sport fishing	WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

	10	Erosion control: nonstructural	60 Channel clearing
	20	Erosion control: structural	70 Soil productivity enhancement
**	30	Erosion control: non & structural	80 Structural fisheries habitat improvement
	40	Road obliteration	90 Nonstructural fisheries hab. improvements
	50	Pollution abatement	

17. Priority	18. Est. acres	18a. Est. rip. acres	19. NO. structures
high, mod, low	IN .10		1 surf. eros.

- SKETCH

- An in-channel stockpond has triggered an upstream headcut. Install a small, loose rock headcut stabilizing structure. Some shallow gullying is also occurring along the channel below the pond. Leaving some grass longer than 1/4 inch at the end of the season would help to heal the raw spots.

-Township & Range-

T32N | R10E

Section: SWNE Sec. 18

Project:	KEY	SCALE
Date:		
Drawn by:		

20. Estimated Total Cost

INITIAL

$ 2,000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%

Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

Prepared by (signature) | Date: / /

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT	1. FOREST 06 (Lassen)	
	2. DISTRICT 58 (Eagle Lake)	3. SITE NAME Champs-McCoy RR #1

******* I LOCATION *******

4. State	5. NPS watershed code	6. Sub-watershed code
06 (CA)	1808000304 (Eagle Lake basin)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
013 (Ashurst MA)		014 (Champs Flat)	PC-10

******* II SITE CONDITION *******

11. Site Category (circle those that are appropriate)

	01	Debris clogged channel	12 Abandoned system trail
**	02	Lake or stream bank erosion	13 Abandoned mines
**	03	Damaged riparian	14 Abandoned barrow pits
	04	Damaged meadows	15 Fire damaged areas
**	05	Gully erosion	16 Reduced quality spawning habitat
	06	Sheet/rill erosion	17 Reduced quantity spawning habitat
	07	Mass wasting	18 Reduced quality rearing habitat
	08	Soil compaction	19 Reduced quantity rearing habitat
**	09	Abandoned road	20 Reduced wildlife cover
	10	Damaged system road	21 Reduced dead and down material
**	11	Abandoned trail	22 Reduced wildlife forage

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
** DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
GRAZ = Damage caused by cattle or sheep grazing programs
** HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
** ROAD = System and nonsystem roads, roadcuts, and fill slopes
SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

** DEC = Declining (Class III)
CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)	14. Stream class (cirle choice below)
YES / NO --Yes	Class: I,II,III,IV --I

15. Beneficial uses (cirle those that are appropriate)

	MUN	= Municipal and domestic supply	GWR = Ground water recharge
**	AGR	= Agricultural supply	POW = Hydropower generation
	REC2	= Water non contact	REC1 = Water contact rec
**	WILD	= Wildlife habitat	BIOL = Special biol. signif. area
	PSS	= Forest Service sensitive species	T&ES = State listed T&E species
	T&EP	= Federally Listed Threatened and Endangered species	
	RARE	= Preservation of Rare and Endangered species	
	COLD	= Cold/fresh water habitat	** SPWN = Fish spawning
	SPTF	= Instream sport fishing	WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

	10	Erosion control: nonstructural	60 Channel clearing
**	20	Erosion control: structural	70 Soil productivity enhancement
	30	Erosion control: non & structural	80 Structural fisheries habitat improvement
**	40	Road obliteration	90 Nonstructural fisheries hab. improvements
	50	Pollution abatement	

17. Priority high, mod, low	18. Est. acres	18a. Est. rip. acres	19. NO. structures
H	1.0	0.2	1 surf. eros.
	IN .10		

- SKETCH

- The railroad grade was built too close to Pine Creek, both horizontally and vertically. High flows have eroded large volumes of RR grade fill downstream to McCoy Flat (and on to Eagle Lake). Need to use a tractor to push up a boulder dam at the high water diversion point where flood flows divert onto the RR grade. In this reach of Pine Creek flows are naturally confined to a well-armored channel, and they ought to be kept there!

-Township & Range-

T33N R10E

Section: SW 1/4, Sec. 30

Project:

KEY

SCALE

Date:

Drawn by:

20. Estimated Total Cost

INITIAL

$ 1,000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%

Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

Prepared by (signature)

Date: / /

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT	1. FOREST: 06 (Lassen)	
	2. DISTRICT: 58 (Eagle Lake)	3. SITE NAME: Champs-McCoy RR #2

******* I LOCATION *******

4. State	5. NFS watershed code	6. Sub-watershed code
06 (CA)	1808000304 (Eagle Lake basin)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
013 (Ashurst MA)		014 (Champs Flat)	PC-11

******* II SITE CONDITION *******

11. Site Category (circle those that are appropriate)

	01	Debris clogged channel	12 Abandoned system trail
**	02	Lake or stream bank erosion	13 Abandoned mines
	03	Damaged riparian	14 Abandoned barrow pits
	04	Damaged meadows	15 Fire damaged areas
**	05	Gully erosion	16 Reduced quality spawning habitat
	06	Sheet/rill erosion	17 Reduced quantity spawning habitat
	07	Mass wasting	18 Reduced quality rearing habitat
	08	Soil compaction	19 Reduced quantity rearing habitat
**	09	Abandoned road	20 Reduced wildlife cover
	10	Damaged system road	21 Reduced dead and down material
**	11	Abandoned trail	22 Reduced wildlife forage

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
** DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
GRAZ = Damage caused by cattle or sheep grazing programs
** HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
** ROAD = System and nonsystem roads, roadcuts, and fill slopes
SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

** DEC = Declining (Class III)
CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)	14. Stream class (cirle choice below)
YES / NO --Yes	Class: I,II,III,IV --I

15. Beneficial uses (cirle those that are appropriate)

	MUN = Municipal and domestic supply		GWR = Ground water recharge
**	AGR = Agricultural supply		POW = Hydropower generation
	REC2 = Water non contact		REC1 = Water contact rec
**	WILD = Wildlife habitat		BIOL = Special biol. signif. area
	FSS = Forest Service sensitive species		T&ES = State listed T&E species
	T&EF = Federally Listed Threatened and Endangered species		
	RARE = Preservation of Rare and Endangered species		
	COLD = Cold/fresh water habitat	**	SPWN = Fish spawning
	SPTF = Instream sport fishing		WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

	10	Erosion control: nonstructural	60 Channel clearing
**	20	Erosion control: structural	70 Soil productivity enhancement
	30	Erosion control: non & structural	80 Structural fisheries habitat improvement
**	40	Road obliteration	90 Nonstructural fisheries hab. improvements
	50	Pollution abatement	

17. Priority	18. Est. acres	18a. Est. rip. acres	19. NO. structures
H	1.0	0.2	
high, mod, low	IN .10		1 surf. eros.

- SKETCH

- Same situation and recommended cure as site PC-10!!

-Township & Range-

T33N	R10E

Section: SW 1/4 Sec. 30

Project:	KEY	SCALE
Date:		
Drawn by:		

20. Estimated Total Cost
INITIAL
$ 1000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%
Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

Prepared by (signature) Date: / /

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT	1. FOREST: 06 (Lassen)	
	2. DISTRICT: 58 (Eagle Lake)	3. SITE NAME: Bogard branch @ 22 road

******* I LOCATION *******

4. State	5. NFS watershed code	6. Sub-watershed code
06 (CA)	1808000304 (Eagle Lake basin)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
021 (Cone MA)		063 (Upper Pine Creek)	PC-12

******* II SITE CONDITION *******

11. Site Category (circle those that are appropriate)

	01	Debris clogged channel	12 Abandoned system trail
	02	Lake or stream bank erosion	13 Abandoned mines
	03	Damaged riparian	14 Abandoned barrow pits
	04	Damaged meadows	15 Fire damaged areas
	05	Gully erosion	16 Reduced quality spawning habitat
	06	Sheet/rill erosion	17 Reduced quantity spawning habitat
	07	Mass wasting	18 Reduced quality rearing habitat
	08	Soil compaction	19 Reduced quantity rearing habitat
	09	Abandoned road	20 Reduced wildlife cover
**	10	Damaged system road	21 Reduced dead and down material
	11	Abandoned trail	22 Reduced wildlife forage

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
GRAZ = Damage caused by cattle or sheep grazing programs
** HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
** ROAD = System and nonsystem roads, roadcuts, and fill slopes
SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

DEC = Declining (Class III)
** CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)	14. Stream class (cirle choice below)
YES / NO --no	Class: I,II,III,IV --II

15. Beneficial uses (cirle those that are appropriate)

	MUN = Municipal and domestic supply		GWR = Ground water recharge
**	AGR = Agricultural supply		POW = Hydropower generation
	REC2 = Water non contact		REC1 = Water contact rec
**	WILD = Wildlife habitat		BIOL = Special biol. signif. area
	FSS = Forest Service sensitive species		T&ES = State listed T&E species
	T&EF = Federally Listed Threatened and Endangered species		
	RARE = Preservation of Rare and Endangered species		
**	COLD = Cold/fresh water habitat	**	SPWN = Fish spawning
	SPTF = Instream sport fishing		WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

10	Erosion control: nonstructural	** 60	Channel clearing
20	Erosion control: structural	70	Soil productivity enhancement
30	Erosion control: non & structural	80	Structural fisheries habitat improvement
40	Road obliteration	** 90	Nonstructural fisheries hab. improvements
50	Pollution abatement		

17. Priority high, mod, low	18. Est. acres	18a. Est. rip. acres	19. NO. structures
L	0.2	0.2	1 stream channel
	IN .10		

- SKETCH

- The culvert inlet has been damaged by large debris, and the rim of the culvert inlet is bent inward. Debris is hanging-up on the inlet, impairing flows and fish passage. The
- cure is to:

(1) Remove the debris;

(2) Sledgehammer the culvert rim back into place; and/or

(3) Replace the culvert or add a new inlet "funnel" with a deflecting flange, to better direct streamflow through the pipe.

-Township & Range-

T31N | R8E

Section: NWNW Sec. 8

Project:	KEY	SCALE
Date:		
Drawn by:		

20. Estimated Total Cost
INITIAL
$ 5,000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%
Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

Prepared by (signature) Date: / /

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT	1. FOREST: 06 (Lassen)	
	2. DISTRICT: 58 (Eagle Lake)	3. SITE NAME: Antelope RR grade

******* I LOCATION *******

4. State	5. NFS watershed code	6. Sub-watershed code
06 (CA)	1808000304 (Eagle Lake basin)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
019 (Crater MA)		014 (Champs Flat)	PC-13

******* II SITE CONDITION *******

11. Site Category (circle those that are appropriate)

	01	Debris clogged channel	12 Abandoned system trail
**	02	Lake or stream bank erosion	13 Abandoned mines
	03	Damaged riparian	14 Abandoned barrow pits
**	04	Damaged meadows	15 Fire damaged areas
**	05	Gully erosion	16 Reduced quality spawning habitat
**	06	Sheet/rill erosion	17 Reduced quantity spawning habitat
	07	Mass wasting	18 Reduced quality rearing habitat
	08	Soil compaction	19 Reduced quantity rearing habitat
**	09	Abandoned road	20 Reduced wildlife cover
	10	Damaged system road	21 Reduced dead and down material
**	11	Abandoned trail	22 Reduced wildlife forage

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
** DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
GRAZ = Damage caused by cattle or sheep grazing programs
** HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
** ROAD = System and nonsystem roads, roadcuts, and fill slopes
SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

** DEC = Declining (Class III)
CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)	14. Stream class (cirle choice below)
YES / NO --No	Class: I,II,III,IV --III

15. Beneficial uses (cirle those that are appropriate)

	MUN = Municipal and domestic supply	**	GWR = Ground water recharge
**	AGR = Agricultural supply		POW = Hydropower generation
	REC2 = Water non contact		REC1 = Water contact rec
**	WILD = Wildlife habitat		BIOL = Special biol. signif. area
	FSS = Forest Service sensitive species		T&ES = State listed T&E species
	T&EF = Federally Listed Threatened and Endangered species		
	RARE = Preservation of Rare and Endangered species		
	COLD = Cold/fresh water habitat		SPWN = Fish spawning
	SPTF = Instream sport fishing		WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

	10	Erosion control: nonstructural	60 Channel clearing
**	20	Erosion control: structural	70 Soil productivity enhancement
	30	Erosion control: non & structural	80 Structural fisheries habitat improvement
	40	Road obliteration	90 Nonstructural fisheries hab. improvements
	50	Pollution abatement	

RANGE BETTERMENT $?

17. Priority high, mod, low	18. Est. acres	18a. Est. rip. acres	19. NO. structures
H	40	5	1
IN .10			

- SKETCH

- An abandoned railroad across the lower end of Antelope Valley was used as the major part of a low dam, to create a small wetland. High water spilled over the grade at its old channel location--not through the prepared spillway. Two remedies are possible:

(1) Clear out the old channel and remove enough of the grade to let high water pass without further erosion of the grade; or

(2) Rebuild the dam, using more accurate surveying techniques, to assure that the spillway is indeed the lowest part of the dam.

-Township & Range-

T33N R10E

Section: SW1/4, Sec.31

Project:

KEY

SCALE

Date:

Drawn by:

20. Estimated Total Cost
INITIAL
$ 2,000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%

Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

Prepared by (signature)

Date: / /

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT	1. FOREST: 06 (Lassen)	
	2. DISTRICT: 58 (Eagle Lake)	3. SITE NAME: WP RR grade, nr. HWY 44

******* I LOCATION *******

4. State	5. NFS watershed code	6. Sub-watershed code
06 (CA)	1808000304 (Eagle Lake basin)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
023 (Campbell MA)		063 (Upper Pine Creek)	PC-14

******* II SITE CONDITION *******

11. Site Category (circle those that are appropriate)

	01	Debris clogged channel	12 Abandoned system trail
**	02	Lake or stream bank erosion	13 Abandoned mines
**	03	Damaged riparian	14 Abandoned barrow pits
**	04	Damaged meadows	15 Fire damaged areas
	05	Gully erosion	16 Reduced quality spawning habitat
	06	Sheet/rill erosion	17 Reduced quantity spawning habitat
	07	Mass wasting	18 Reduced quality rearing habitat
	08	Soil compaction	19 Reduced quantity rearing habitat
	09	Abandoned road	20 Reduced wildlife cover
	10	Damaged system road	21 Reduced dead and down material
	11	Abandoned trail	22 Reduced wildlife forage

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
** DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
GRAZ = Damage caused by cattle or sheep grazing programs
HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
** ROAD = System and nonsystem roads, roadcuts, and fill slopes
SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

** DEC = Declining (Class III)
CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)	14. Stream class (cirle choice below)
YES / NO --Yes	Class: I,II,III,IV --I

15. Beneficial uses (cirle those that are appropriate)

	MUN	= Municipal and domestic supply	GWR = Ground water recharge
**	AGR	= Agricultural supply	POW = Hydropower generation
	REC2	= Water non contact	REC1 = Water contact rec
	WILD	= Wildlife habitat	BIOL = Special biol. signif. area
	FSS	= Forest Service sensitive species	T&ES = State listed T&E species
	T&EF	= Federally Listed Threatened and Endangered species	
	RARE	= Preservation of Rare and Endangered species	
	COLD	= Cold/fresh water habitat	** SPWN = Fish spawning
	SPTF	= Instream sport fishing	WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

10	Erosion control: nonstructural	** 60	Channel clearing
20	Erosion control: structural	70	Soil productivity enhancement
30	Erosion control: non & structural	80	Structural fisheries habitat improvement
** 40	Road obliteration	90	Nonstructural fisheries hab. improvements
50	Pollution abatement		

17. Priority	18. Est. acres	18a. Est. rip. acres	19. NO. structures
H	2000	200.0	
high, mod, low	IN .10		1+str. channel

- SKETCH

THIS IS THE PRESENTLY-ACTIVE WESTERN PACIFIC RAILROAD TURNPIKE ACROSS PINE CREEK VALLEY.

- There are two problems here: (1) A general impact, and (2) An immediate, local effect.

GENERAL PROBLEM: The railroad grade has confined and channelized flood flows, gradually

- lowering the floodplain on the north side of the valley, at the expense of the south half of the valley. The large culvert/bridge confines all but the highest flood flows

- to that spot, and meandering cycle has been stopped or limited in upper Pine Creek Valley. The best solution is to obliterate the grade for its full distance across the valley floor, whenever the railroad finally abandons the line (if ever).

SPECIFIC PROBLEM: A smaller problem can be cured right away, without cooperation from the railroad company. A raised brow has formed in the streambed, just below the culvert under

- the grade. It diverts low flows out of the natural channel, into a long, narrow pond in the borrow ditch along the RR.

- The ditch should be dammed on each side of the culvert's outlet, to force all flows down the channel into the valley.

-Township & Range-

T31N	R8E

Section: SWNW Sec. 3

Project:	KEY	SCALE
Date:		
Drawn by:		

20. Estimated Total Cost

$ INITIAL 20,000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%

Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

WATERSHED CONDITION INVENTORY FOR WATER AND SOIL IMPROVEMENT	1. FOREST 06 (Lassen)	
	2. DISTRICT 58 (Eagle Lake)	3. SITE NAME Remnant aspen stand

***** I LOCATION *****

4. State	5. NFS watershed code	6. Sub-watershed code
06 (CA)	1808000304 (Eagle Lake)	A (Pine Creek)

7. Compartment NO.	8. Stand NO.	9. RANGE Allotment NO.	10. Map Reference NO.
013 (Ashurst MA)		014 (Champs Flat)	PC-15

***** II SITE CONDITION *****

11. Site Category (circle those that are appropriate)

	01	Debris clogged channel	12 Abandoned system trail
	02	Lake or stream bank erosion	13 Abandoned mines
**	03	Damaged riparian	14 Abandoned barrow pits
	04	Damaged meadows	15 Fire damaged areas
	05	Gully erosion	16 Reduced quality spawning habitat
	06	Sheet/rill erosion	17 Reduced quantity spawning habitat
	07	Mass wasting	18 Reduced quality rearing habitat
	08	Soil compaction	19 Reduced quantity rearing habitat
	09	Abandoned road	20 Reduced wildlife cover
	10	Damaged system road	** 21 Reduced dead and down material
	11	Abandoned trail	22 Reduced wildlife forage

11. Disturbance source (circle those that are appropriate)

DRED = Resuspension of pollutants by dredging
DIST = Disturbed sites, includes active land disturbing phase and sites no longer subject to active land construction (ex. roads), and unstabilized development
DUMP = Waste disposal site
GEOT = Geothermal development
** GRAZ = Damage caused by cattle or sheep grazing programs
HYDR = Hydrologic modification (diversion, impoundments, hydro effects of discharges)
MINI = Mineral extraction
NATU = Natural (i.e. fire, floods, mass wasting)
OHVS = Off highway vehicles
RECR = Recreational (developed & dispersed, including trails)
ROAD = System and nonsystem roads, roadcuts, and fill slopes
SILV = Silviculture
SPEC = Special uses
SEPT = Septic systems/onsite disposal
URBA = Urban runoff

12. Site condition (cirle those that are appropriate)

** DEC = Declining (Class III)
CON = Constant (Class II)
SAT = Satisfactory (Class I)

13. Nonpoint source (circle choice below)	14. Stream class (cirle choice below)
YES / NO --Yes	Class: I,II,III,IV --I

15. Beneficial uses (cirle those that are appropriate)

	MUN	= Municipal and domestic supply	GWR = Ground water recharge
**	AGR	= Agricultural supply	POW = Hydropower generation
	REC2	= Water non contact	REC1 = Water contact rec
**	WILD	= Wildlife habitat	BIOL = Special biol. signif. area
	FSS	= Forest Service sensitive species	T&ES = State listed T&E species
	T&EF	= Federally Listed Threatened and Endangered species	
	RARE	= Preservation of Rare and Endangered species	
	COLD	= Cold/fresh water habitat	** SPWN = Fish spawning
	SPTF	= Instream sport fishing	WTS = Wild trout stream

16. Treatment Proposed (circle those that are appropriate)

10	Erosion control: nonstructural	60	Channel clearing
20	Erosion control: structural	** 70	Soil productivity enhancement
30	Erosion control: non & structural	** 80	Structural fisheries habitat improvement
40	Road obliteration	90	Nonstructural fisheries hab. improvements
50	Pollution abatement		

17. Priority	18. Est. acres	18a. Est. rip. acres	19. NO. structures
H	0.2	5	
high, mod, low	IN .10		NA

- SKETCH

This site is the last remnant of an aspen clone that probably extended toward Stanford Camp. It consists of a few, grazed-out, old aspen surviving on the bouldery face of a lava flow next to the creek, before Pine Creek opens-out into Champs Flat. The few stubby, old aspen that remain are still trying to sprout, but most of the sprouts are browsed when they are can be reached by cattle. Two actions are possible:

(1) Inatall an exclosure fence, to foster regeneration of this isolated aspen clone where it is; or

(2) Use cuttings from the clone to restore a hardwood component to the riparian zone in the Stanford Headquarters area.

-Township & Range-

T33N | R9E

Section: SESE Sec. 33

Project:	KEY	SCALE
Date:		
Drawn by:		

20. Estimated Total Cost

INITIAL

$ 2,000

Cost Distribution: Watershed___% Rge___% wildlife___% Engr___%

Rec___% KV___% Timber___% Other___%

26. Fiscal Year Project Completed

Appendix 4--Pine Creek riparian zone vegetation

...Forthcoming material to be written by zone ecologist Sydney Smith, who works out of the Modoc National Forest. Initial sampling plots were surveyed in 1989.

Appendix 5--1988 Coordinated Resource Management Plan for Pine Creek

This appendix is a copy of the 1988 coordinated resource management plan for Pine Creek. (This is the current agreement.)

PINE CREEK
COORDINATED RESOURCE MANAGEMENT PLAN
AUGUST, 1988

Eagle Lake RD, Lassen NF	California Dept. of Fish and Game
Lahonton RWQCB	Soil Conservation Service
Eagle Lake Resource Area, BLM	U. of California Extension Service
Ducks Unlimited	Eagle Lake Audubon Society
Jay and Don Dow	Pierce McClelland
Dick Norris	Bob Thompson
Ken Wells	Craig Ditman
Carl Rimby	Mapes Ranch
Bill Keeler	George Bailey
Jerry Stevens	Honey Lake Valley RCD
California Trout	

I. INTRODUCTION

During the spring of 1987, the Eagle Lake Ranger District initiated a review of management activities in the Pine Creek drainage. This review resulted from concerns expressed both internally and externally regarding the condition of the Pine Creek riparian area, the quantity and quality of water flowing into Eagle Lake via Pine Creek, and the need to prioritize conflicting management needs.

The result of that review was a decision to expand the scope of the analysis and the persons involved. A field trip and follow-up meetings were held in September and October, 1987 to which affected agencies and individuals were invited; these meetings were informative and productive and some common management strategies began to emerge. At a meeting of these interested parties in November, 1987 the participants decided that a more formalized group would better be able to continue the planning and project implementation effort and agreed to work together in a Coordinated Resource Management (CRM) effort.

II. DESCRIPTION

Pine Creek is the largest tributary to Eagle Lake. The watershed area of Pine Creek is 119,358 acres of which 104,676 (87.7%) is National Forest ownership; the other major landowner is Fruit Growers Supply Company, and there are a number of smaller landowners. As the primary tributary to Eagle Lake, Pine Creek has significant effects on both the water quality of Eagle Lake and the Eagle Lake fishery. Major resource uses in the Pine Creek drainage are timber management, livestock grazing, wildlife (including fisheries and waterfowl) management and recreation.

III. ISSUES

The issues which have been identified by the group are:

The deteriorated condition of Pine Creek; this includes lack of riparian vegetation, erosion of streamchannnels and streambanks, lowered watertables, and the quality, quantity, and timing of streamflow.

The deteriorated condition of vegetative cover in much of the rangeland portion of the Pine Creek drainage.

The need to resolve conflicting management objectives; i.e. fisheries, waterfowl, range.

IV. GOALS AND OBJECTIVES

The long-range goals which have been agreed to by the group for the long-term management of Pine Creek are:

Improve vegetative cover in the Pine Creek watershed

Improve the streambank stability of Pine Creek

Raise the streambed and watertable in the drainage and spread out peak flows of Pine Creek

Restore the natural Eagle Lake trout fishery in Pine Creek

Improve wildlife habitat along Pine Creek

Reduce nutrient and sediment loading into Eagle Lake from Pine Creek

Maintain grazing and timber management

Meet goals in a coordinated effort with all affected parties

Since most of the goals are inter-related, the group has developed the following objectives in response to the goals in their entirety:

By 1990, implement grazing management systems in the Pine Creek allotments, which privide for riparian enhancement/restoration.

Beginning in 1988, complete rehabilitation plans for the Logan Springs, Champs and McCoy segments of Pine Creek at the rate of one per year. Initiate implementation of the plans by the year following completion.

By August, 1988 design and begin implementation of a monitoring program to measure results of Coordinated Resource Management in Pine Creek.

Develop a program of work by April, 1 annually, that will schedule short- and long-range project specific work planning.

V. MANAGEMENT DIRECTION

The Eagle Lake Ranger District, U.S. Forest Service, will be the lead agency for the Pine Creek CRM group.

Execution of CRM projects will be the responsibility of the Forest Service; the Forest Service however may utilize additional sources of funding or other assistance from Federal, State or private sources in order to meet project objectives.

A steering committee will be selected by the group to be responsible for direction and priority setting to meet the stated goals and objectives of the CRM group; technical committees will be established as needed to meet specific needs.

Modifications to livestock management practices will be documented in allotment management plans.

An annual field trip will be held to review work progress and planned projects.

Monitoring and evaluation will be given a high priority.

Appendix 6--Hydrological graphs for Pine Creek gauging stations

The graphs in this appendix illustrate the "average" flow pattern (flow duration curves) and the magnitude of peak flows for various return periods at two gauging stations in the Pine Creek watershed. The "outlet" station is located at the Department of Fish and Game's weir and fish trap, approximately 200 yards upstream from Eagle Lake. The "Bogard" station is no longer operational. It is located 1 1/2 miles upstream from Highway 44 and approximately 100 yards upstream from Bogard Campground.

DURATION PLOT OF DAILY DATA FOR ... YEAR ENDING SEPTEMBER 30 (YEARS 1961 - 1982)
STATION ID: 10359300 PINE CREEK NR SUSANVILLE CALIF DRAINAGE AREA = 226.00 SQ. MI.

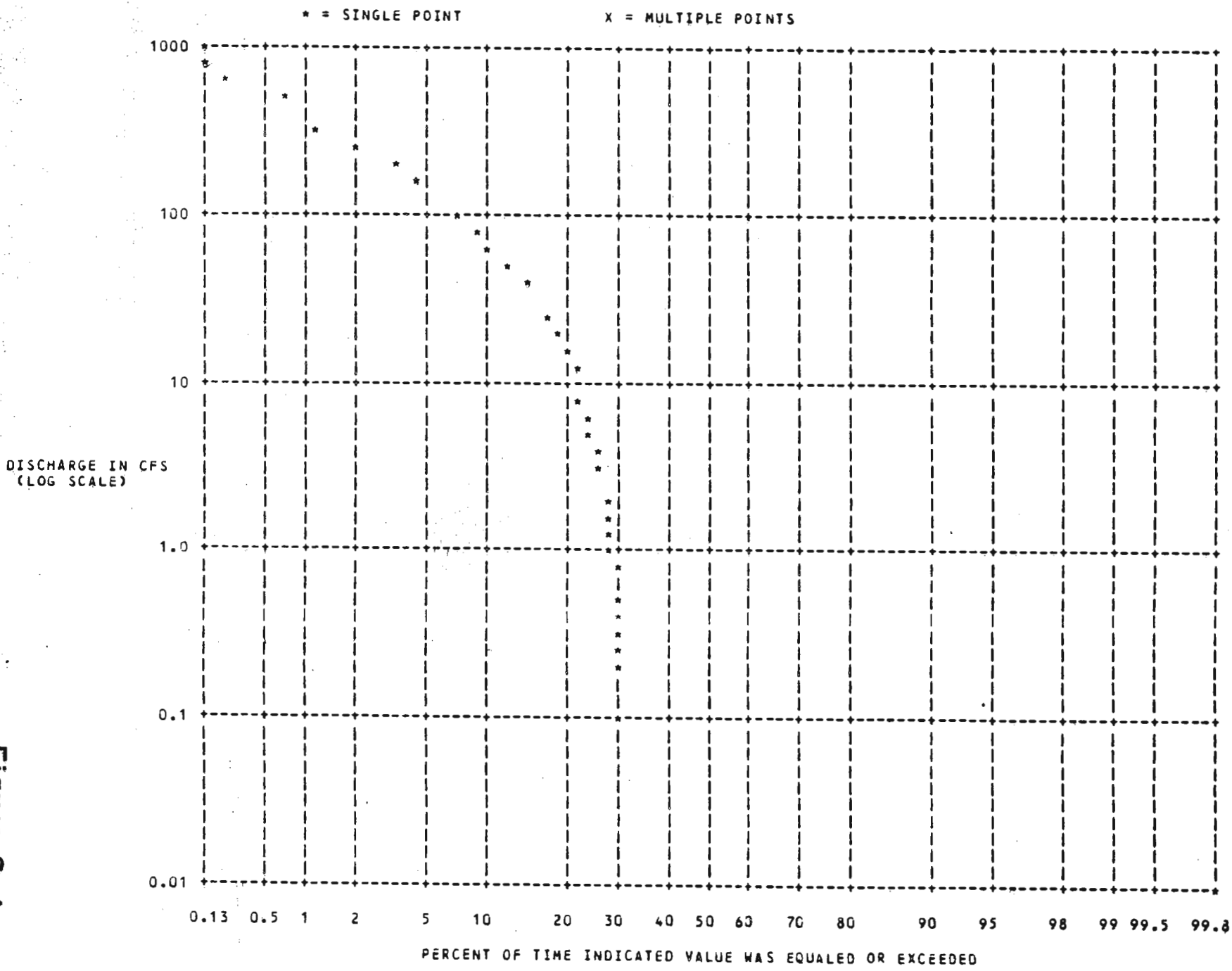


Figure 6-1

PGM J407 VER 3.7
(REV 11/5/81)

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
FOLLOWING WRC GUIDELINES BULL. 17-B.

RUN-DATE 3/30/87 AT 1452 SEQ 1.0002

STATION - 10359300 /USGS PINE CREEK NR SUSANVILLE CALIF 1961-1982 10359300 /USGS

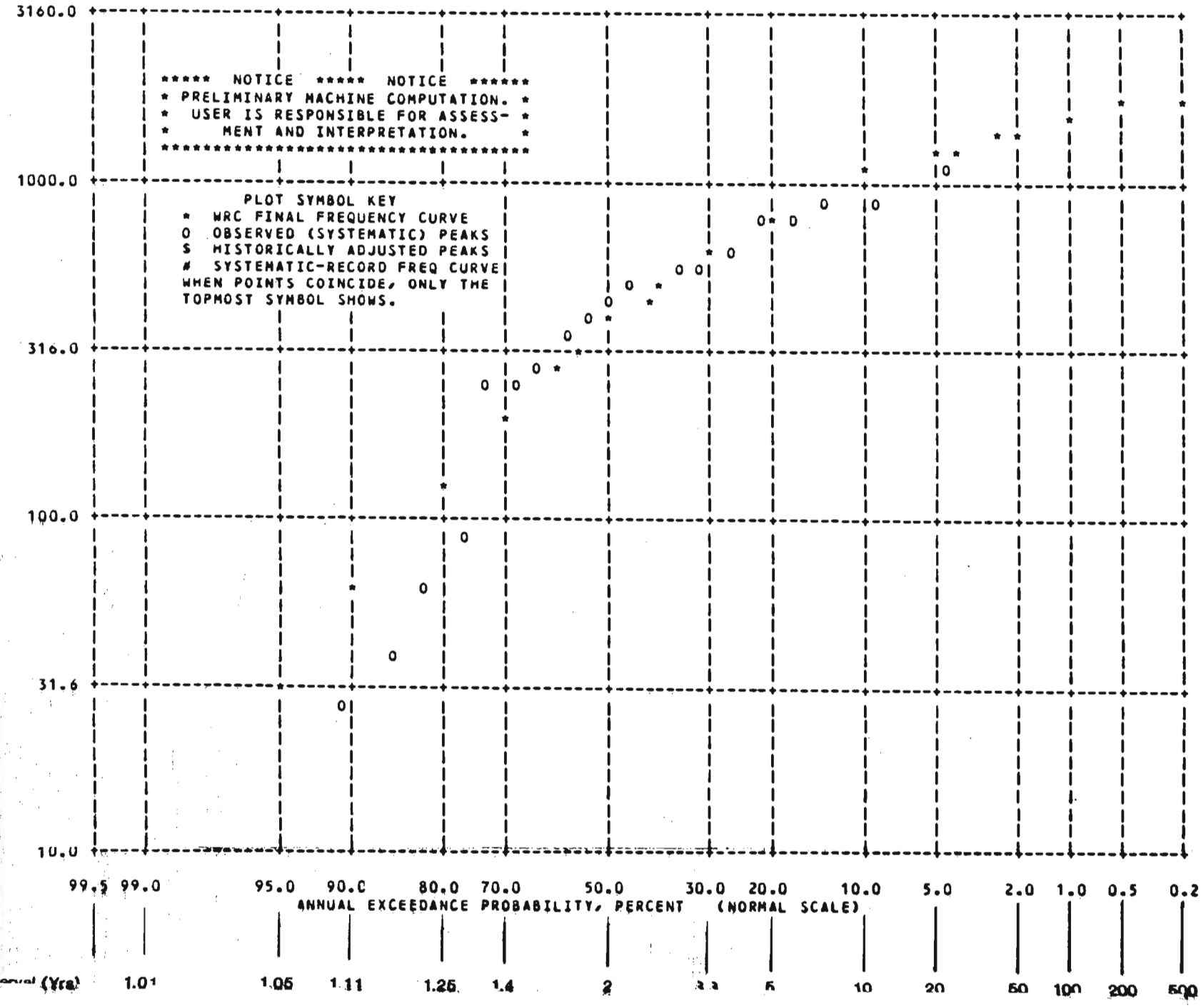


Figure 6-2

DURATION PLOT OF DAILY DATA FOR ... YEAR ENDING SEPTEMBER 30 (YEARS 1951 - 1961)
STATION ID: 10359250 PINE C NR WESTWOOD CALIF

DRAINAGE AREA = 24.80 SQ. MI.

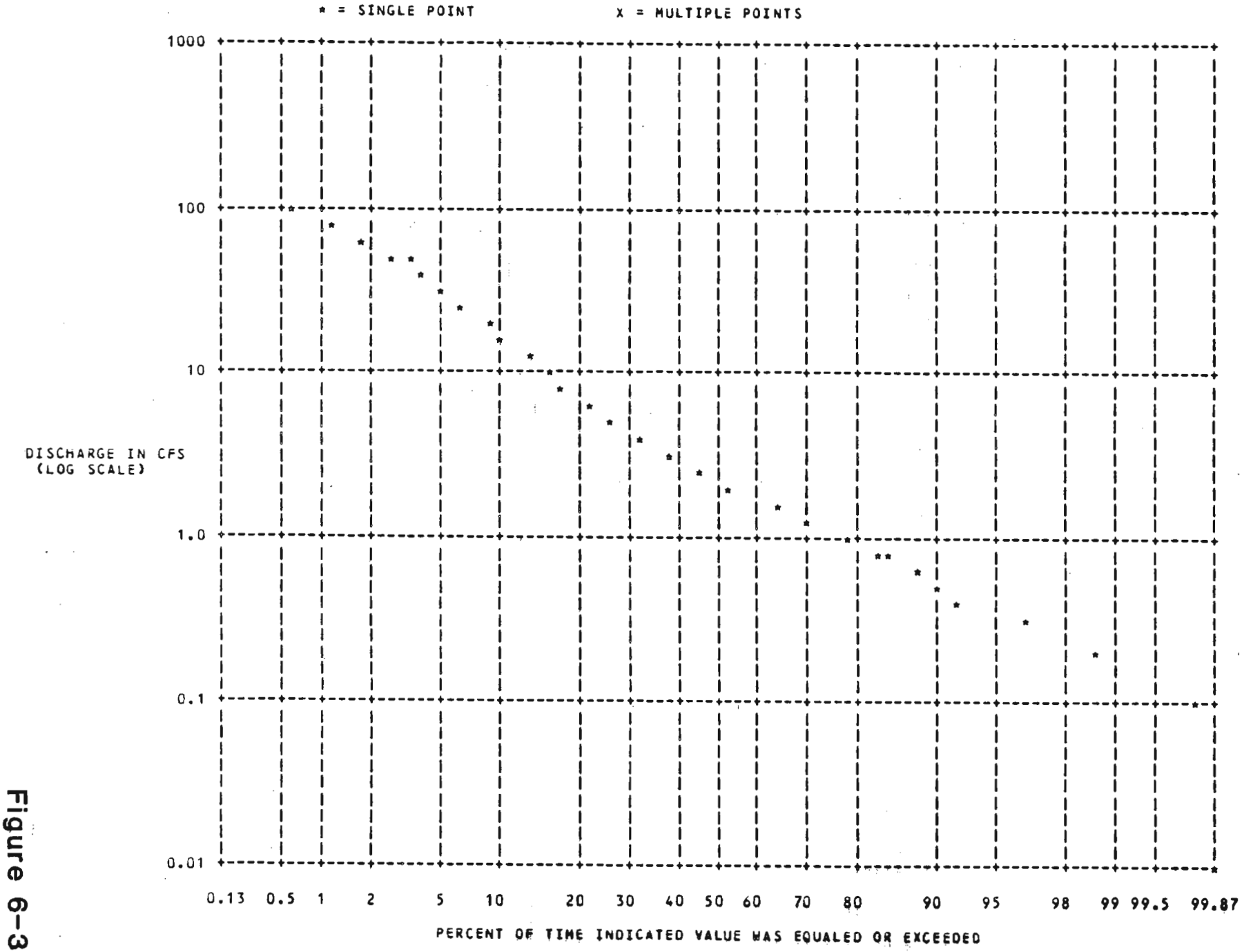


Figure 6-3

PGM J407 VER 3.7
(REV 11/5/81)

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
FOLLOWING WRC GUIDELINES BULL. 17-B.

RUN-DATE 3/30/87 AT 1452 SEQ 1.0001

STATION - 10359250 /USGS PINE C NR WESTWOOD CALIF 1951-1978 10359250 /USGS

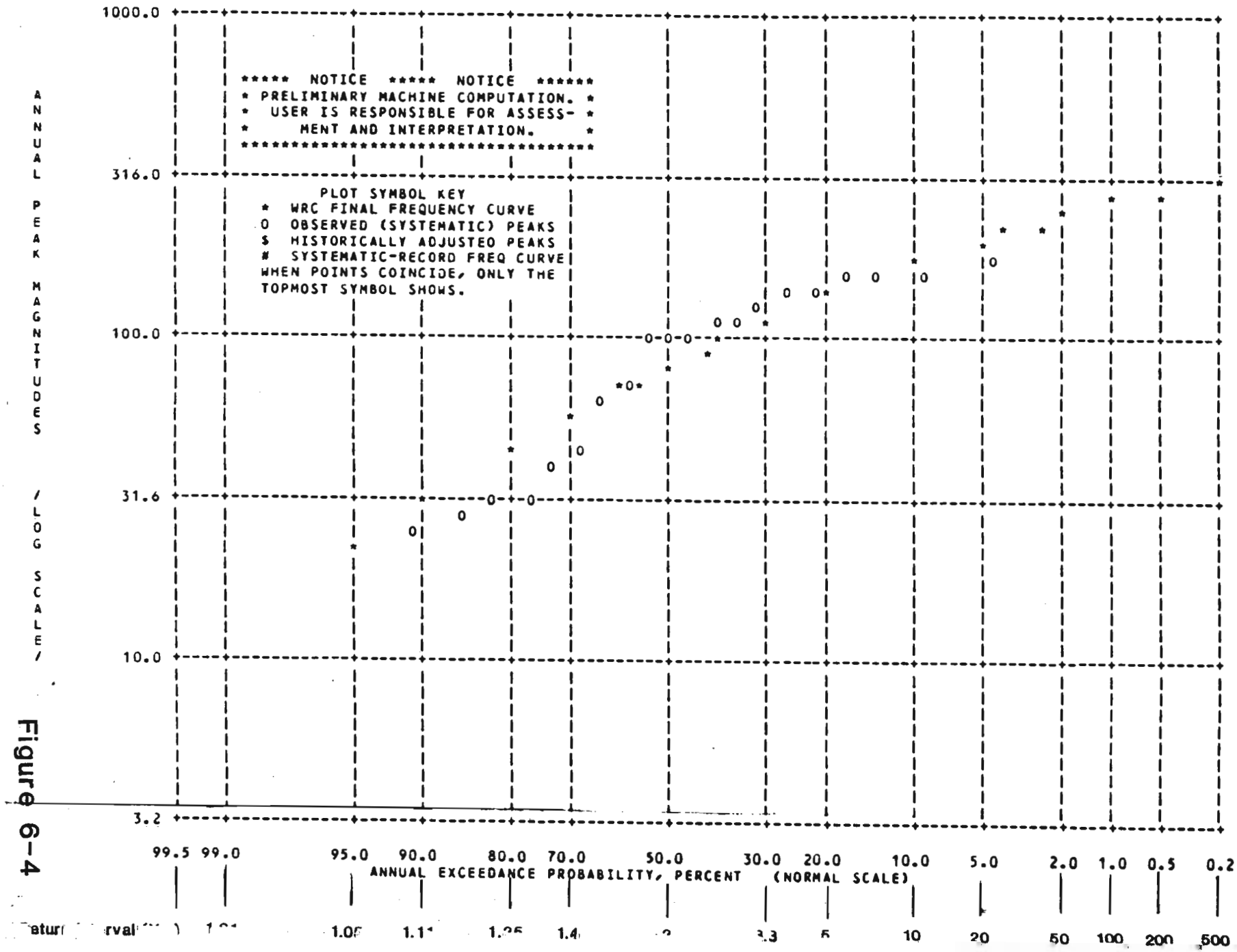
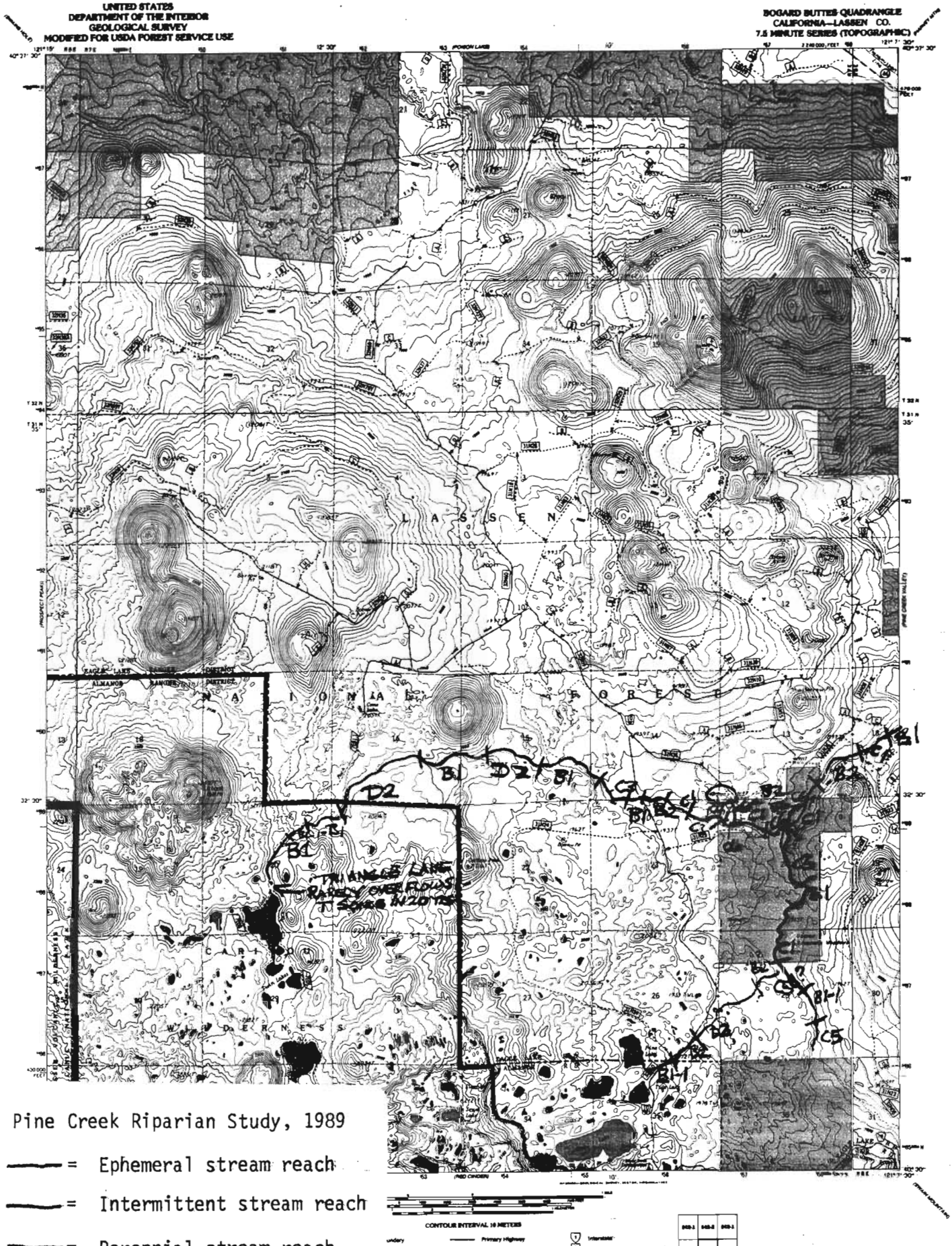


Figure 6-4

Appendix 7--Pine Creek channel type maps

...The results of July, 1989 field work, showing Rosgen stream channel types[4] for full length of Pine Creek's main channel and for some major tributaries.

4. One reference is Rosgen, David L., 1985. A stream classification system. Tucson, AZ: symposium, Riparian Ecosystems and Their Management, April 16-18, 1985.

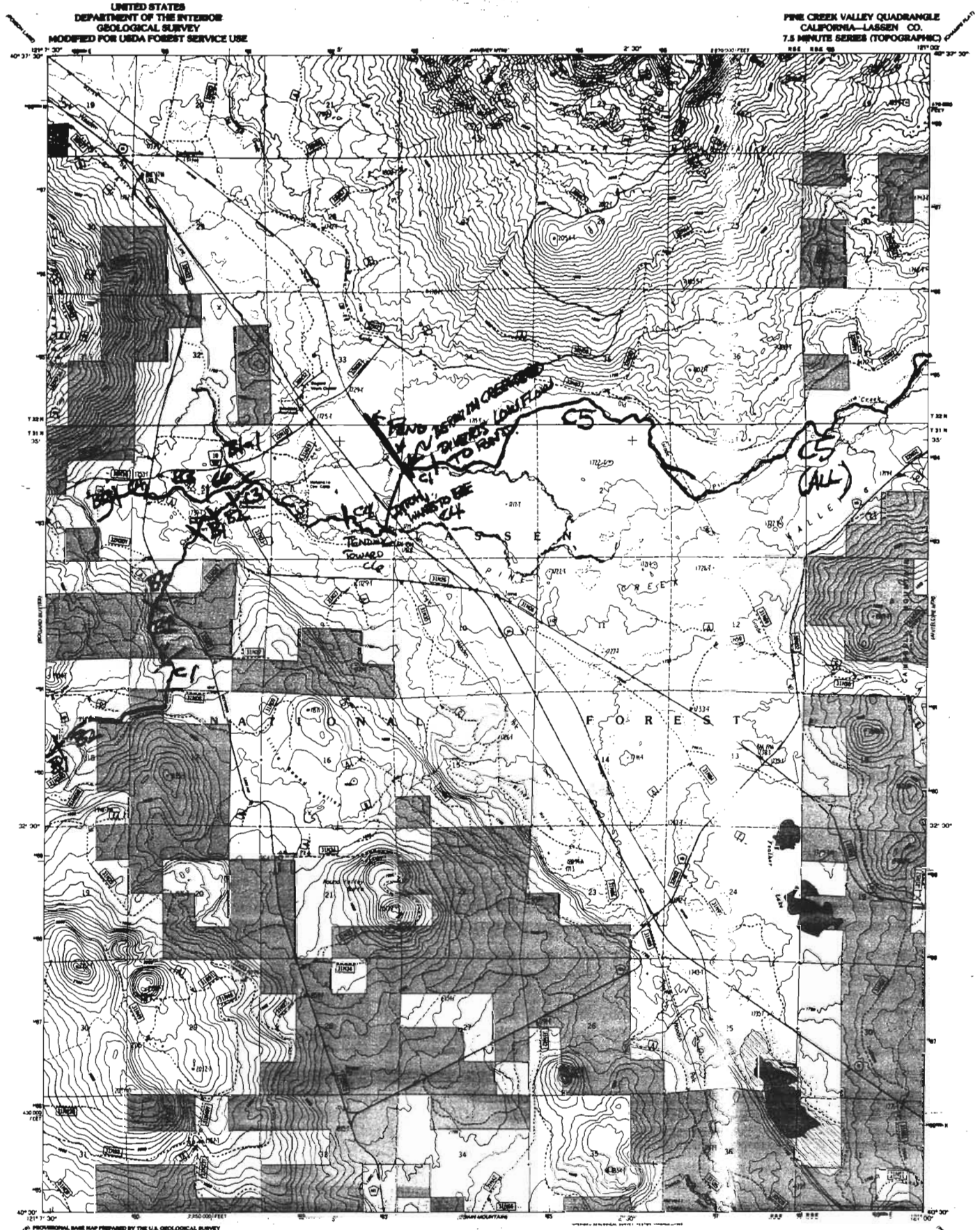


Pine Creek Riparian Study, 1989

——— = Ephemeral stream reach

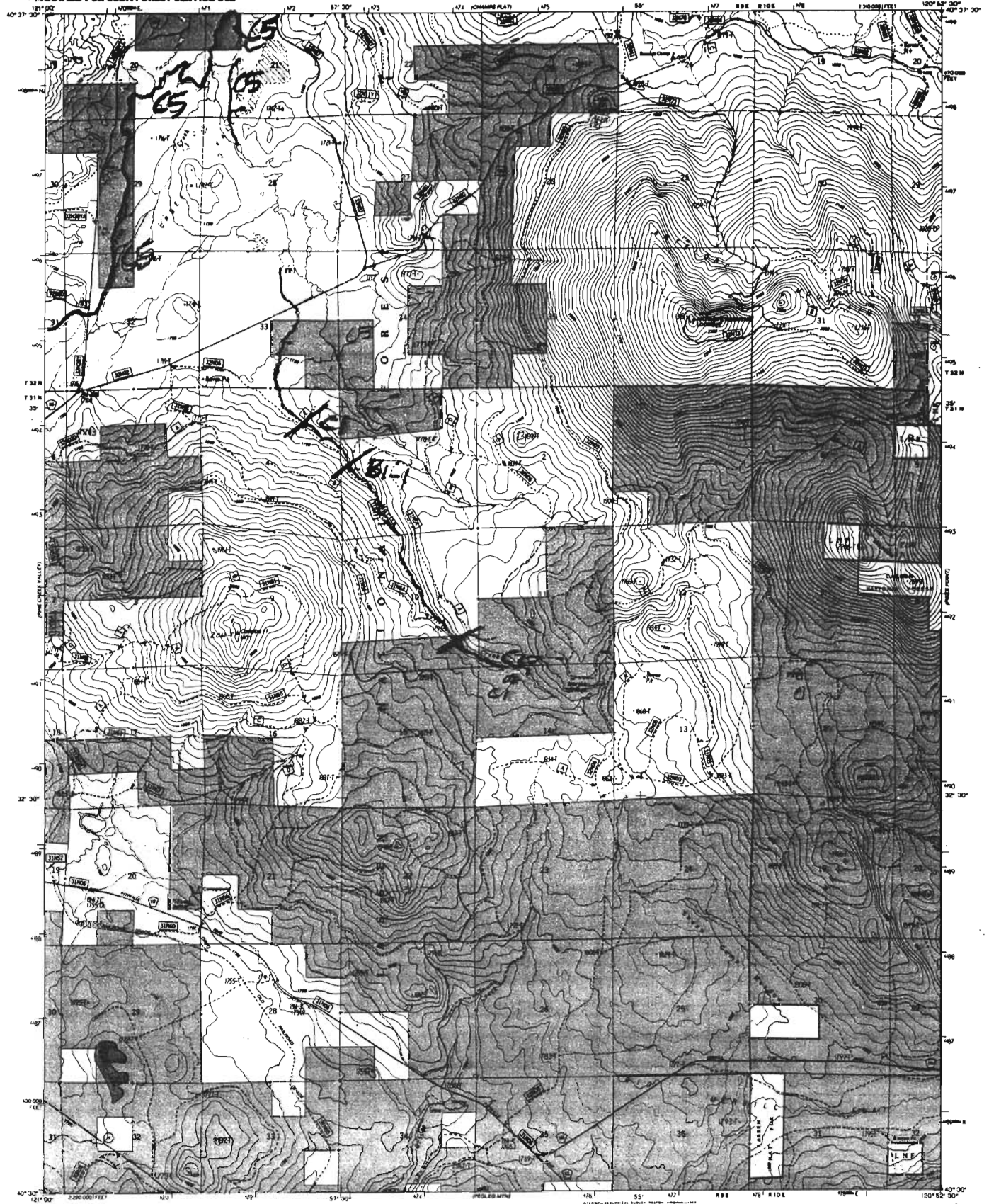
——— = Intermittent stream reach

——— = Perennial stream reach


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE
PINE CREEK VALLEY QUADRANGLE
CALIFORNIA—LASSEN CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
PINE CREEK VALLEY, CALIF.
PROVISIONAL EDITION 1985
N4030—W12100/7.5
642-4
REVISED 1987
CONTOUR INTERVAL 10 METERS
SUPPLEMENTARY CONTOUR INTERVAL 5 METERS
ADJACENT QUADRANGLE LOCATION DIAGRAM
NATIONAL FOREST
PINE CREEK VALLEY

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

ANTELOPE MTN. QUADRANGLE
CALIFORNIA—LASSEN CO.
7.5-MINUTE SERIES (TOPOGRAPHIC)



PROVISIONAL BASE MAP PREPARED BY THE U.S. GEOLOGICAL SURVEY
CONTROL BY ..... USGS, ROUNDUP
COMPILED FROM AERIAL PHOTOGRAPHS DATED 1985
FIELD CHECKED ..... 1985 NAV EDITED 1985
PROJECTION ..... LAMBERT CONFORMAL CONIC
GRID 10000-METER UNIVERSAL TRANSVERSE MERCATOR ZONE 10
10,000-FOOT STATE GRID TICKS ..... CALIFORNIA, ZONE I

VERTICAL DATUM ..NATIONAL GEODETIC VERTICAL DATUM OF 1929
HORIZONTAL DATUM ..... 1927 NORTH AMERICAN DATUM
To place on the predicted North American Datum of 1983, move the projection lines as shown by dashed corner ticks (17 meters north/90 meters east)
Modifications to USGS base map by the Cartographic Service Center from 1988, 83, 87 aerial photography and 1987 corrections added or furnished by the Pacific Southwest Region.
Landnet revised according to additional Forest Service evidence

UTM GRID AND 1987 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 10 METERS
SUPPLEMENTARY CONTOUR INTERVAL 5 METERS

- National Forest Boundary
- Allotted Lands

TOWNSHIP AND SECTION LINE CLASSIFICATION
- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction

- Primary Highway
- Secondary Highway
- Improved Road, Paved
- Improved Road, Gravel
- Improved Road, Dirt
- Unimproved Dirt
- Trail
- Road, Location Approximate

- Interstate
- U.S. Highway
- State Highway
- County Road
- Primary Forest Route
- Forest Road
- Forest Trail
- Gate

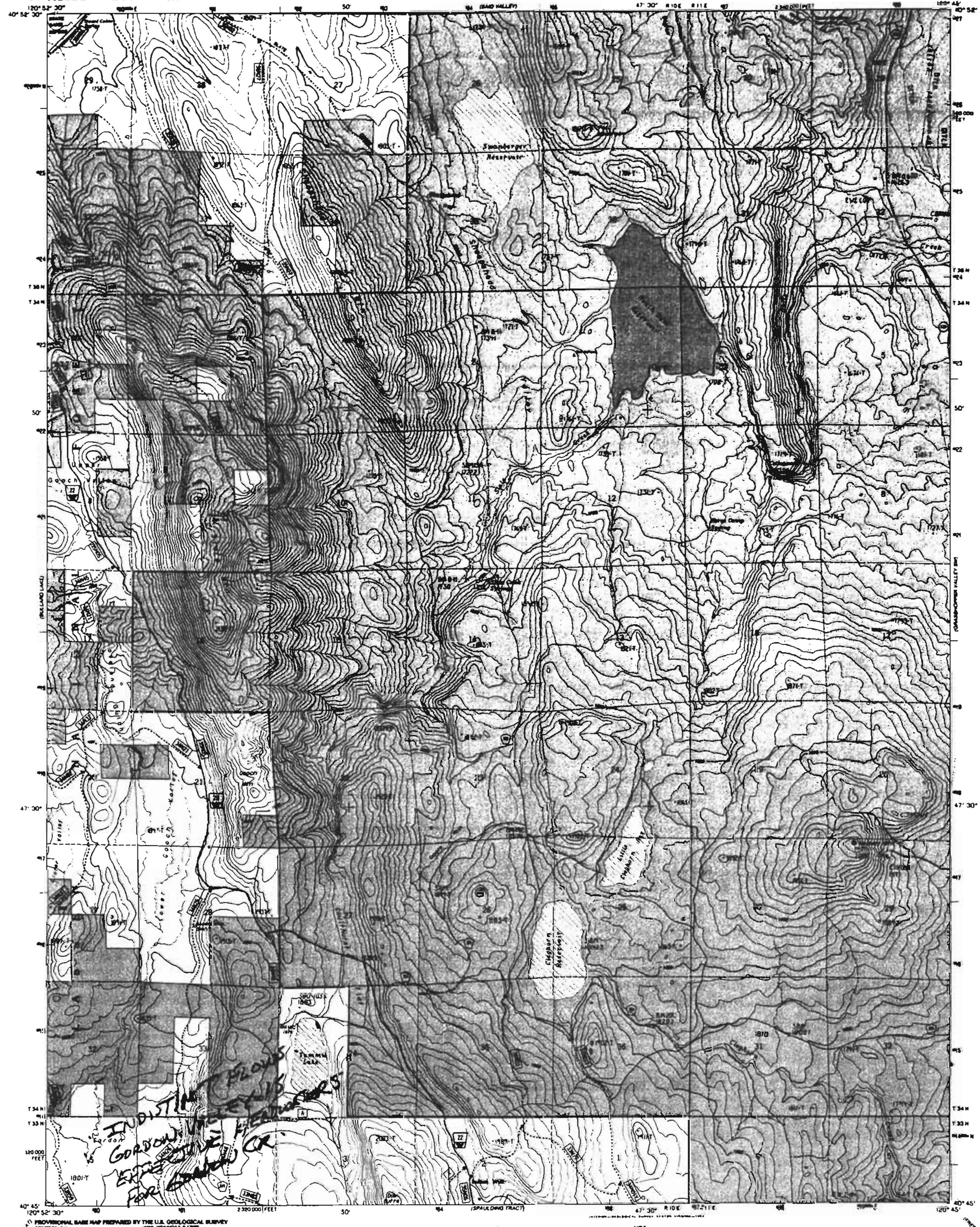
ADJACENT QUADRANGLE LOCATION DIAGRAM

040-1	041-2	041-1
040-4	041-3	041-4
039-1	039-2	039-3

ANTELOPE MTN., CALIF.
PROVISIONAL EDITION 1985
N4030—W12052.5/7.5
641-3
REVISED 1987

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SHEEPSHEAD QUADRANGLE
CALIFORNIA—LASSEN CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



PROVISIONAL BASE MAP PREPARED BY THE U.S. GEOLOGICAL SURVEY
CONTROL BY .... [illegible]
COMPILED FROM AERIAL PHOTOGRAPHS TAKEN .... [illegible]
FIELD CHECKED .... [illegible] MAP EDITED .... [illegible]
PROJECTION .... UNIVERSAL TRANSVERSE MERCATOR
GRID: 1000-METER UNIVERSAL TRANSVERSE MERCATOR .... ZONE 10
10,000-FOOT STATE GRID TICKS .... CALIFORNIA, ZONE 1

VERTICAL DATUM .... NATIONAL GEODETIC VERTICAL DATUM OF 1929
HORIZONTAL DATUM .... 1927 NORTH AMERICAN DATUM
To place on the predicted North American Datum of 1983, move the projection lines as shown by dashed corner ticks (17 meters north / 89 meters east)
Modification to USGS base map by the Geometronics Service Center from 1980, 83, 87 aerial photography and 1987 correction guides furnished by the Pacific Southwest Region.
Landnet revised according to additional Forest Service evidence.

UTM GRID AND 1987 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 10 METERS
SUPPLEMENTARY CONTOUR INTERVAL 5 METERS

National Forest Boundary
Alienated Lands

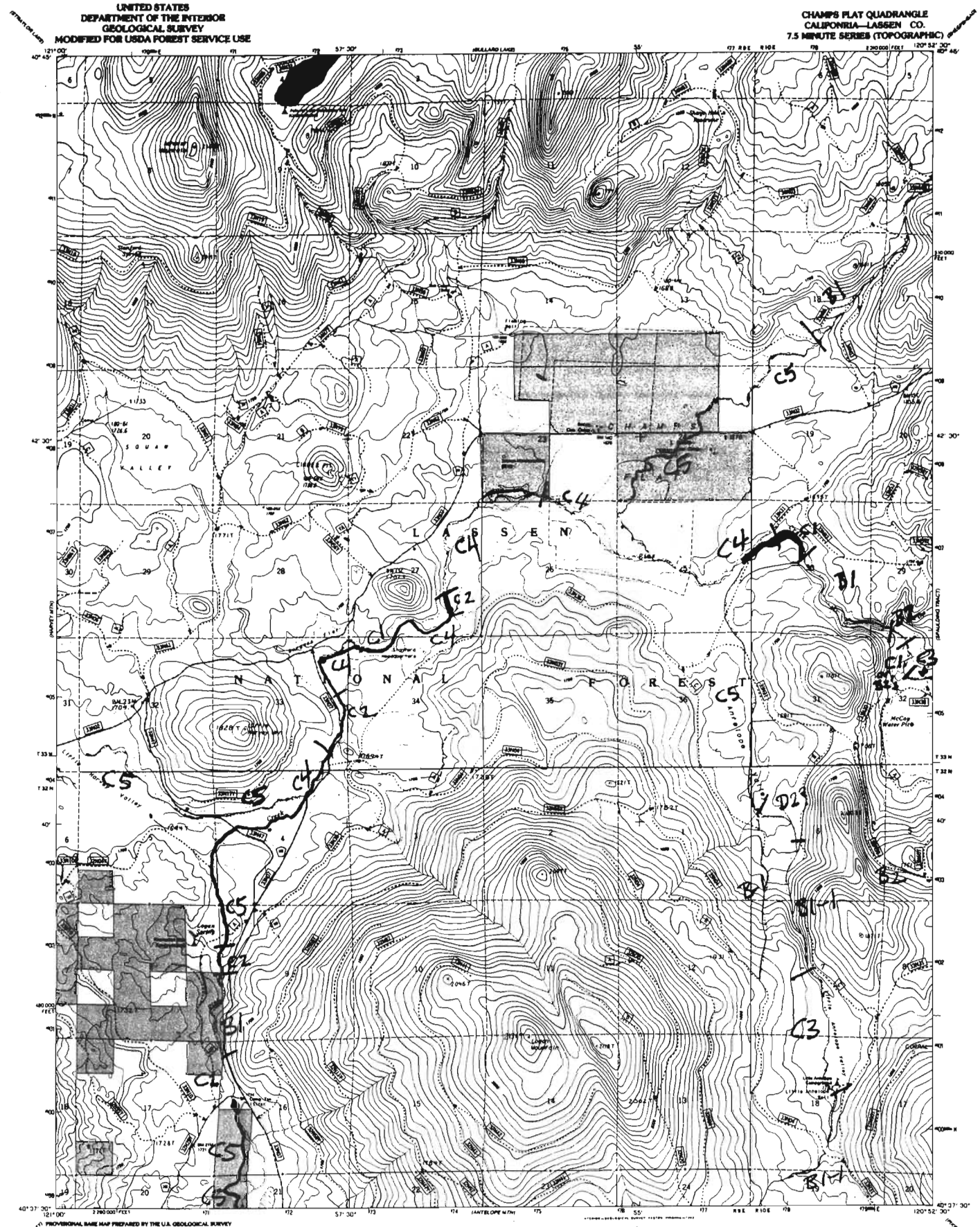
TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

Primary Highway
Secondary Highway
Improved Road, Paved
Improved Road, Gravel
Improved Road, Dirt
Unimproved Dirt
Trail
Road, Location Approximate

Interstate
U.S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail
Gate

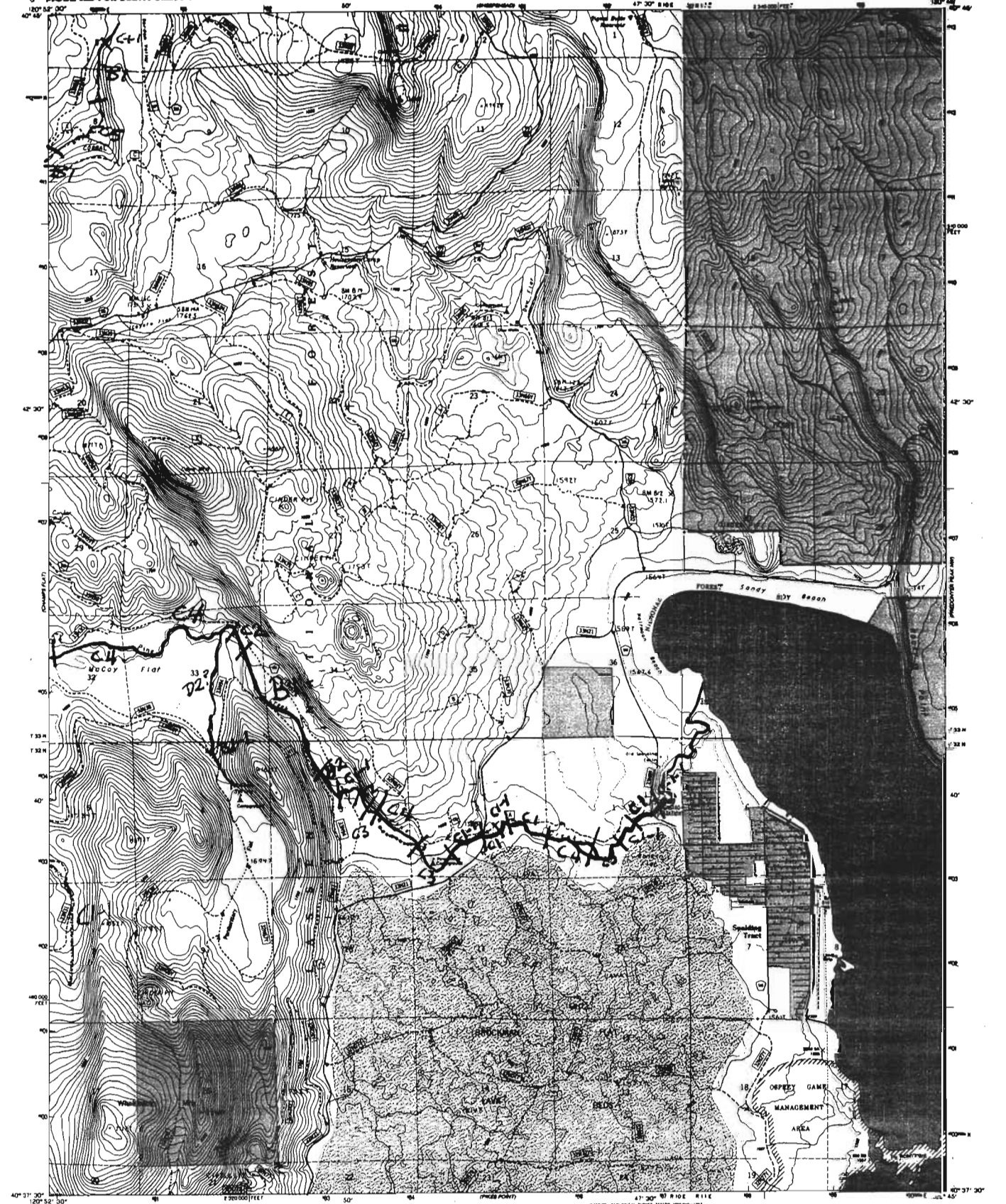
ADJACENT QUADRANGLE LOCATION DIAGRAM

SHEEPSHEAD, CALIF.
PROVISIONAL EDITION 1983
N4045—W12045/7.5
659-4
REVISED 1987


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE
CHAMPS FLAT QUADRANGLE
CALIFORNIA—LASSEN CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
CHAMPS
SQUAW VALLEY
LASSEN NATIONAL FOREST
CONTOUR INTERVAL 10 METERS
SUPPLEMENTARY CONTOUR INTERVAL 5 METERS
National Forest Boundary
Primary Highway
Secondary Highway
Improved Road, Paved
Improved Road, Gravel
Improved Road, Dirt
Unimproved Dirt
Trail
Road, Location Approximate
Interstate
U.S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail
Gate
Alienated Lands
TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction
ADJACENT QUADRANGLE
LOCATION DIAGRAM
CHAMPS FLAT, CALIF.
PROVISIONAL EDITION 1983
N4037.5—W12052.5/7.5
641-2
REVISED 1987

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SPALDING TRACT QUADRANGLE
CALIFORNIA—LASSEN CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



PROVISIONAL EDITION 1983
N4037.5—W12045/7.5

641-1

REVISED 1987

SPALDING TRACT, CALIF.

ADJACENT QUADRANGLE LOCATION DIAGRAM

650-3	650-4	650-3
641-2	641-1	640-2
641-3	641-4	640-3

CONTOUR INTERVAL 10 METERS
SUPPLEMENTARY CONTOUR INTERVAL 5 METERS

National Forest Boundary
Alienated Lands

TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

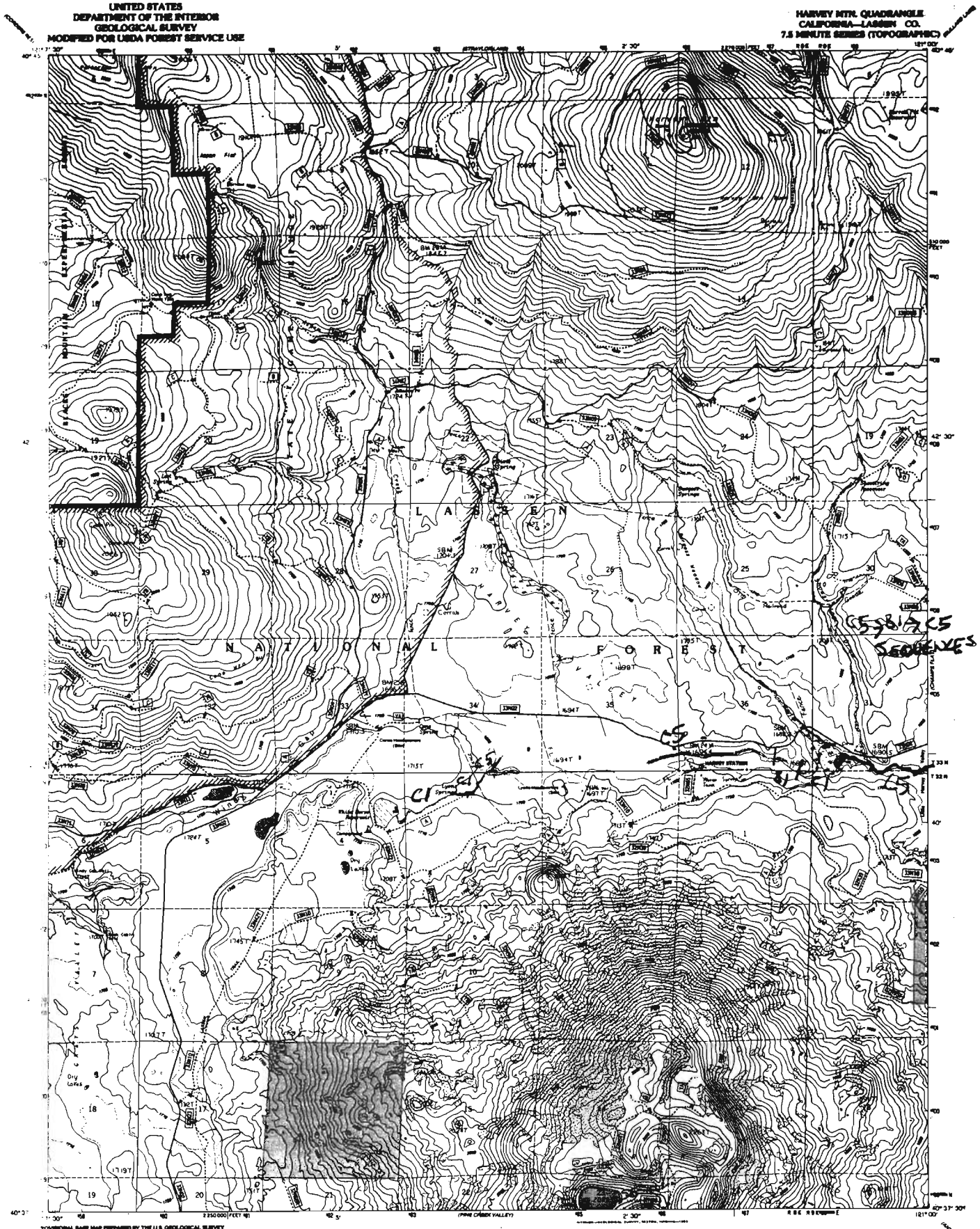
Primary Highway
Secondary Highway
Improved Road, Paved
Improved Road, Gravel
Improved Road, Dirt
Unimproved Dirt
Trail
Road, Location Approximate

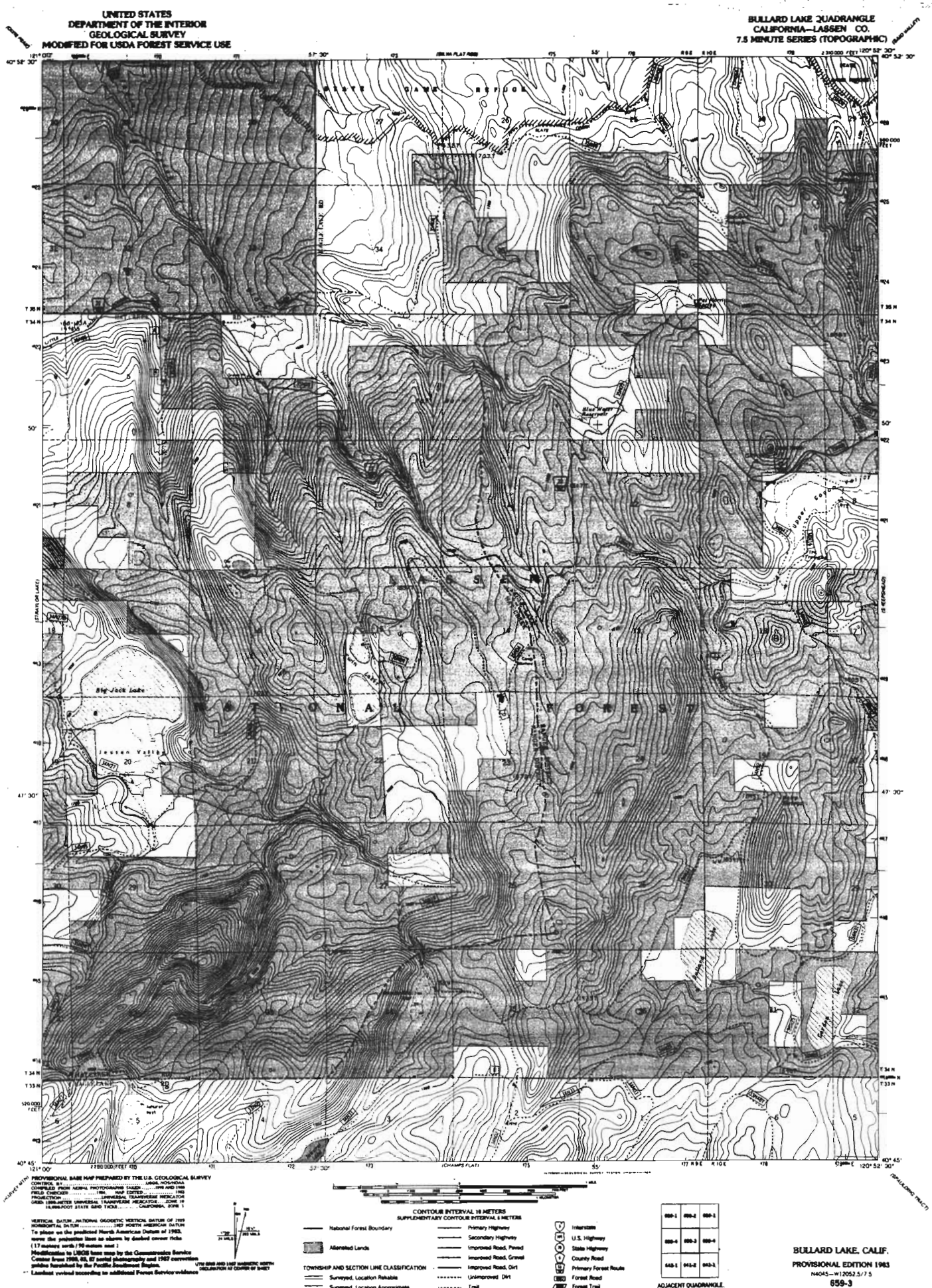
Interstate
U.S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail
Gate

PROVISIONAL EDITION 1983 PHOTOREVISED BARE MAP PREPARED BY THE U.S. GEOLOGICAL SURVEY
CONTROL BY ..... USGS, ROSEBURG, U.S. FOREST SERVICE
COMPILED FROM AERIAL PHOTOGRAPHS TAKEN 1980
FIELD CHECKED ..... 1981 MAP EDITED 1982
PROJECTION ..... LAMBERT CONFORMAL TRANSVERSE MERCATOR
GRIDS: 1000-METER UNIVERSAL TRANSVERSE MERCATOR ..... ZONE 10
10,000-FOOT STATE GRID TICS ..... CALIFORNIA, ZONE 1

VERTICAL DATUM: NATIONAL GEODETIC VERTICAL DATUM OF 1929
HORIZONTAL DATUM ..... 1927 NORTH AMERICAN DATUM
To please on the predicted North American Datum of 1983, move the projection lines as shown by dashed corner ticks (17 meters north / 89 meters east)
Modification to USGS base scale by the Geomorphology Service Center from 1980, 81, 82 aerial photography and 1982 orthophoto guides furnished by the Pacific Southwest Region.
Landnet revised according to additional Forest Service evidence

UTM GRID AND 1987 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE
HARVEY MTN. QUADRANGLE
CALIFORNIA—LASSEN CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
L A S S E N
N A T I O N A L F O R E S T
SEQUENCES
CONTOUR INTERVAL 10 METERS
SUPPLEMENTARY CONTOUR INTERVAL 5 METERS
National Forest Boundary
Allocated Lands
TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction
Primary Highway
Secondary Highway
Improved Road, Paved
Improved Road, Gravel
Improved Road, Dirt
Unimproved Dirt
Trail
Road, Location Approximate
Interstate
U.S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail
Gate
ADJACENT QUADRANGLE LOCATION DIAGRAM
HARVEY MTN., CALIF.
PROVISIONAL EDITION 1988
N4037.5—W12120/7.5
642-1
REVISED 1987


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE
BULLARD LAKE QUADRANGLE
CALIFORNIA—LASSEN CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
MEDICINE LAKE
Big Jack Lake
Jessen Valley
Blue Water Reservoir
Upper Cow Camp
Champs Flat
PROVISIONAL BASE MAP PREPARED BY THE U.S. GEOLOGICAL SURVEY
CONTOUR INTERVAL 10 METERS
SUPPLEMENTARY CONTOUR INTERVAL 5 METERS
TOWNSHIP AND SECTION LINE CLASSIFICATION
ADJACENT QUADRANGLE LOCATION DIAGRAM
BULLARD LAKE, CALIF.
PROVISIONAL EDITION 1983
N4045—W12052.5/7.5
659-3
REVISED 1987